NETWORK WORLD

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Technology rift splits the object community

BY WAYNE ECKERSON

Time is running short for the two major players in the distributed object computing arena — Microsoft Corp. and the Object Management Group (OMG) — to agree on an interoperability plan for their object models.

While each has made overtures to the other, there is little common ground between them. And as each continues to flesh out its object architecture, reconciliation becomes technically and politically more difficult.

"This is the right time to initiate steps [to establish interoperability between] OMG's and Microsoft's object architectures while both architectures are still relatively flexible and under development," said Bob Marcus, chairman of the Corporate Facilitators of Object-Oriented Technology (CFOOT), a group of approximately 250 users who exchange ideas on distributed computing technologies across the Internet.

Without a published interface between OMG's Common Object Request Broker Architecture (CORBA) and Microsoft's Common Object Model (COM), users will be forced to choose between one or the other when trying to integrate applications and systems in a distributed computing environment.

"The development of a standardized interface between [CORBA and COM] would speed the acceptance of object technology by removing the perceived competition between object architectures," Marcus said.

John Rymer, an analyst at the Patri-

See **Rift**, *page 61*

APPN tops TCP/IP in performance face-off

Independent test offers clues to net trade-offs.

BY MICHAEL COONEY

Seattle

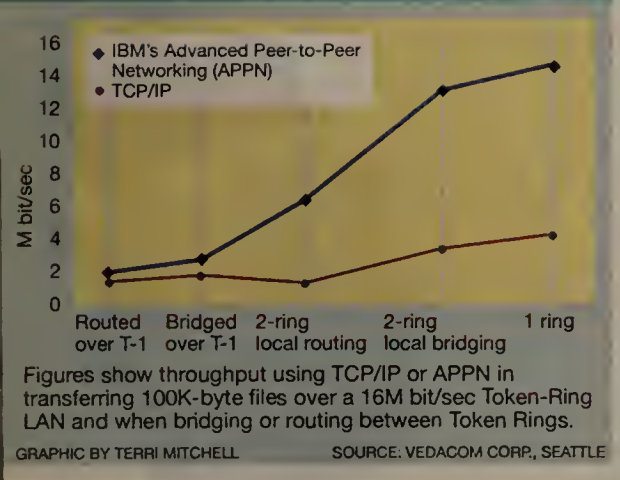
Conventional wisdom says APPN won't measure up to TCP/IP in terms of performance, but independent test results to be released next week show that APPN blows the doors off TCP/IP in certain environments.

The testing — part of a wide-ranging study conducted and funded by Vedacom Corp., a consultancy here — shows IBM's Advanced Peer-to-Peer Networking outperforms Transmission Control Protocol/Internet Protocol by as much as 200% in similar network configurations. The 375-page study examined a variety of APPN and TCP/IP network design issues, as well as the pros and cons of implementing each.

The test results are sure to fan the flames of the APPN vs. TCP/IP debate. IBM's Systems Network Architecture armor has been dented by TCP/IP, and APPN — with its promise of more dynamic peer networking — is at the forefront of IBM's efforts

See **Face-off**, *page 62*

APPN, TCP/IP square off



Figures show throughput using TCP/IP or APPN in transferring 100K-byte files over a 16M bit/sec Token-Ring LAN and when bridging or routing between Token Rings.

GRAPHIC BY TERRI MITCHELL SOURCE: VEDACOM CORP., SEATTLE

DEC places 150-product bet in client/server game

Object-oriented groupware, servers and new Pathworks key components in mini-maker's 'framework' for future.

BY JIM DUFFY

Maynard, Mass.

Digital Equipment Corp. last week launched an initiative that focuses the company's client/server efforts and unveiled 150 products and services to jump-start the plan.

DEC is striving to better coordinate among its various development groups to ensure delivery of interoperable products that users can more easily implement in a client/server environment.

Audrey James Augun and Lee Sudan of DEC.

JOHN THOMPSON

A key to that is the concept of frameworks — DEC guidelines for helping users build network and application infrastructures that support data integration, work group computing, enterprise messaging, and systems and network management.

Key products unveiled with the strategy are an object-oriented groupware program called LinkWorks, higher performance VAX and Alpha servers, and a new release of the vendor's Pathworks local-area network operating system that includes tighter hooks into multivendor environments.

DEC also unveiled new integration services to help users migrate from mainframes to LAN internetworks comprising multivendor systems and software, but with an emphasis on DEC-specific wares.

While several hundred DEC staffers are now proficient in delivering client/server integration services, that number will increase to 7,000 by June 1994, DEC officials said.

With this product and service cannonade, DEC is trying to drive the message home that the company is focused squarely on client/server computing, and products will no longer be developed in a vacuum.

"[Previously], there was no singular belief" in client/server among DEC's product development groups, said Chris Christiansen, an analyst at International Data Corp. in Framingham, Mass. "There were no Ten Commandments at DEC" or a corporatewide vision for the company's various divisions to share.

Now DEC claims there is. "This is our single focus: to provide client/server solutions to our customers," said Lee Sudan, head of multivendor customer services for DEC. "We have all of what it takes to do it."

See **DEC**, *page 62*

OPEN SYSTEMS

Texas backs TCP/IP, drops buy-OSI rule

BY ELLEN MESSMER

Washington, D.C.

In a stinging indictment of OSI, the state of Texas next week will abandon a 2-year-old policy requiring its 240 state agencies to buy Open Systems Interconnection products and will officially back TCP/IP as the basis for open networking.

Texas policymakers, having judged OSI products to be too few and too costly, have decided to promote agency use of the Transmission Control Protocol/Internet Protocol, at least until the OSI product situation improves.

The rescinding of the OSI policy follows a lengthy review by Texas decision makers, which resulted in an emergency rule last August ordering state agencies to buy TCP/IP-based

See **Texas**, *page 61*

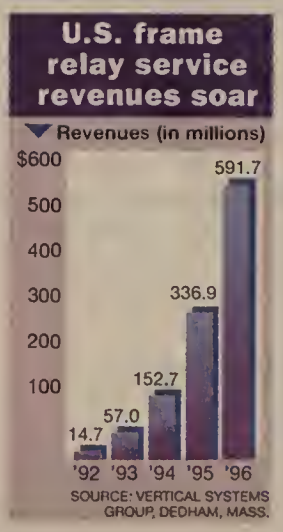
AT&T outlines its frame relay strategy

BY BOB WALLACE

South Plainfield, N.J.

While the technology spotlight has shifted to ATM, frame relay usage is quietly building, gaining momentum as users move from rigid private-line networks to the more dynamic data service.

U.S. frame relay service revenues soar



In an interview with *Network World* at its InterSpan Frame Relay Service Network Operations Center (NOC) here, AT&T said service use is soaring, with the number of new ports installed growing 30% monthly.

Although AT&T will not release revenue growth figures, company officials said the numbers reflect market forecasts from Vertical Systems Group, a Dedham, Mass., consultancy (see graphic). "Frame relay has gained wide acceptance as a proven tool," said Kevin Brand, AT&T frame relay product manager.

The brain center of AT&T's frame relay net is the NOC here, which is in a converted warehouse and not part of the carrier's highly secure NOC in Bedminster, N.J.

While the Bedminster NOC monitors the health of AT&T's transport net — including the facilities that support frame relay — the frame relay NOC is staffed around-the-clock by technicians who monitor the health of each

See **Frame relay**, *page 13*

Briefs

IBM showing its VisualAge. IBM this week will announce a new object-oriented client/server application development tool called VisualAge. The software, which was code-named Camelot, will be available for individual developers as well as in a team version that will feature a server-based object repository. VisualAge will enable users to build applications that work with a variety of IBM and non-IBM databases and protocols. It will be available early next year, with the individual version costing $2,500 per developer and the team version priced at $5,000 per developer.

IBM also will introduce Rediscovery, a tool that will let users make existing COBOL source code into objects that can be reused by VisualAge developers, and will announce plans for an Advanced Application Generator, which will enable users moving from host-based environments to build CICS and related applications for client/server environments.

Eunetcom closes in on first customer. Eunetcom, the outsourcing joint venture created a year ago by France Telecom and Deutsche Bundespost Telekom, last week said it has a letter of intent from IBM for a centrally managed, high-speed net linking 40 of the vendors' sites in France, Germany and four unidentified countries.

At your service. A group of 14 vendors last week announced the Technical Support Alliance Network (TSANet). TSANet will establish guidelines for vendors to follow when working together to solve users' multivendor net problems. The group will also link the existing vendor-specific technical support alliances of its members. Those members are 3Com Corp., Apple Computer, Inc., Banyan Systems, Inc., Compaq Computer Corp., Hewlett-Packard Co., IBM, Lotus Development Corp., NetFRAME Systems, Inc., Novell, Inc., The Santa Cruz Operation, Inc, Standard Microsystems Corp., SynOptics Communications, Inc., Tricord Systems, Inc. and Wall Data, Inc. For more information, call (913) 345-9311.

Global disaster recovery. The Societe de Telecommunications Aeronautics (SITA) and SunGard Disaster Recovery Services, Inc. have signed an agreement to jointly provide contingency Management Service and Disaster Recovery Hotsite Services. SITA will offer backup services from the 210-country private net it uses to provide telecommunications and information processing to 530 of the world's airlines and air transport-related firms. SunGard will provide backup sites in the U.S. and will offer users outside the U.S. software that automates the process of maintaining and updating disaster recovery plans.

US West sets ATM services strategy. US West Communication Services, Inc.'s Advanced Communications Services (ACS) unit will this week detail a three-phase program that will enable the company to provide Asynchronous Transfer Mode (ATM)-based services within the next two years. ACS has selected Newbridge Networks, Inc. as a provider of ATM switches for the network periphery and plans to soon select a supplier of backbone switches. The Newbridge switches will be used for two user trials to be completed in mid-1994. Full ATM service deployment is set for mid-1995.

Cows and Elvis. According to UPI, software engineers Scott Garcia and Robert Cuenca last week won the $250 grand prize for the second consecutive year in the annual Useless Software competition for their Flying Toilets screen saver program, a sequel to last year's Bungie Cows. With Bungie Cows, cows on elastic cords jump down into the computer screen then spring back up, wiping off the screen image as they go. Flying Toilets shows newspaper-reading cows or Elvis on a porcelain throne.

Contacts

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Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.*

We are running a nondedicated server supporting Novell, Inc.'s NetWare Version 2.2, as well as Arcnet and Ethernet cards. Occasionally, the print server logs off the file server and "Pserver start," the command that starts or stops print services, tells us there are not enough Sequenced Packet Exchange (SPX) connections. We must reboot to get the print server running again. How can we prevent this?

Steve Kass, Sterling Heights, Mich.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day per week NetWare technical support company in Lake Oswego, Ore., replies:

I would suggest you load the latest version of Pserver.vap (PSERV5.EXE) from the NOVLIB forum on CompuServe. If you have an older version of Pserver, that could be causing the problem.

Also, since you are running a nondedicated server, try putting the statement "SPX CONNECTIONS = 60" in your shell.cfg or net.cfg on the server. This will help print services run on the nondedicated server.

You may also need to check the number of file service processes (FSP) available in FConsole. To do this, type FCONSOLE at the DOS prompt. If you only have two or three FSPs, this could explain part of the problem. A low number of FSPs indicates the server does not have enough resources to work with.

Finally, see what driver is used for the Arcnet card. Type CONFIG at the file server colon prompt to get this information. To avoid problems, use the driver supplied by the card manufacturer.

Are there any ways for Lotus Development Corp. cc:Mail users to exchange mail with WordPerfect Corp. WordPerfect Office users?

Claudio Lichtenthal, Boston

See **Help desk,** *page 48*

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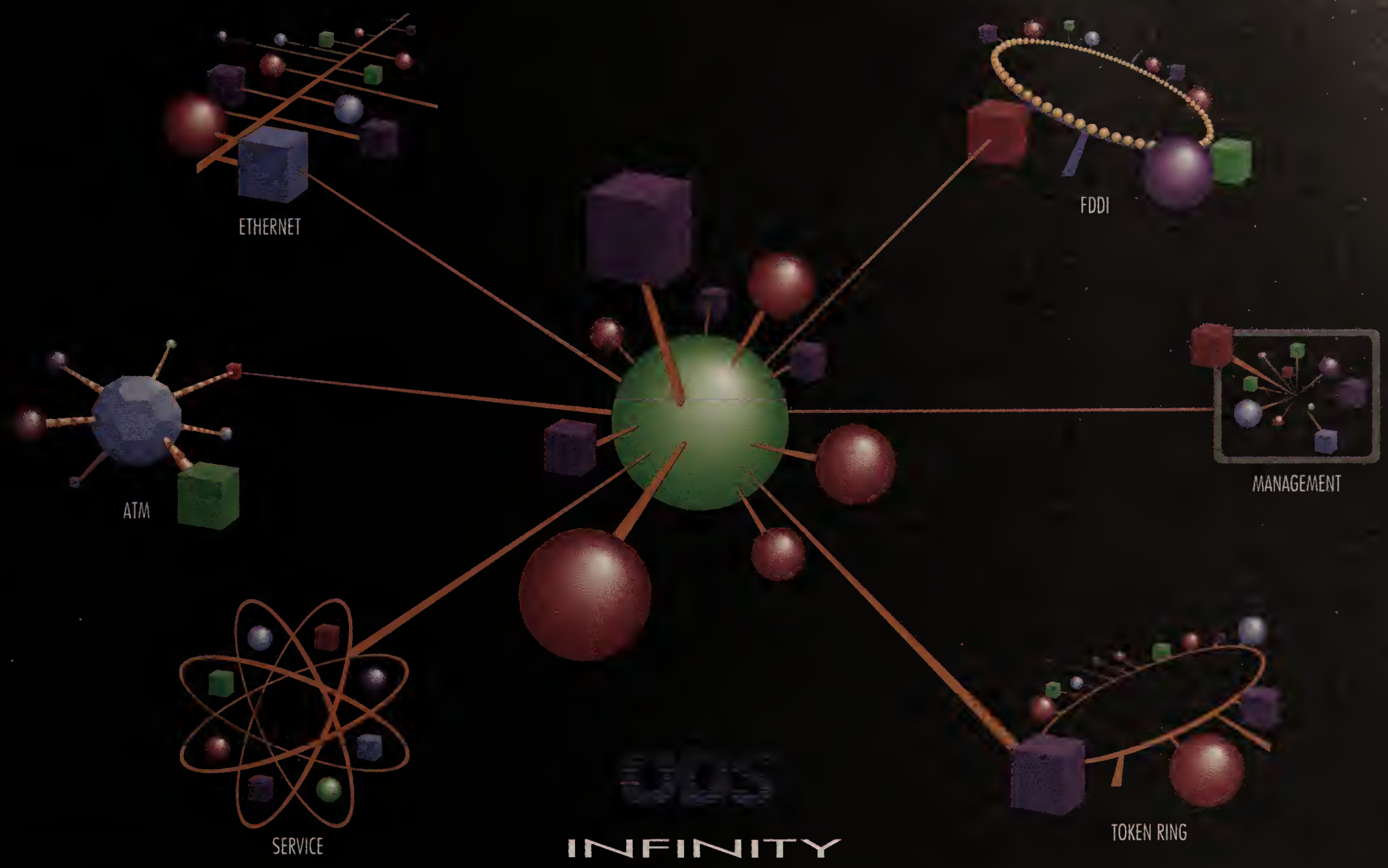

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HIGHLIGHTS

Also from the show:

Connecting remote net nodes. Page 6.

SynOptics, HP boost mgmt. wares. Page 6.

IBM, Microsoft detail LAN-based mgmt. platforms

BY CHRISTINE BURNS

Dallas

Flanked by dozens of third-party application developers pledging support, IBM and Microsoft Corp. used last week's NetWorld 93 conference here to detail their respective plans to manage distributed, multivendor local-area networks.

IBM's LAN NetView and Microsoft's Hermes both allow network administrators to view and manage hardware and software components on a LAN. But IBM addresses the problem by layering on more products, while Microsoft is trying to capitalize on management capabilities built into Windows NT.

While one may not be better than the other, each has distinct characteristics.

IBM has taken an integrated approach to the problem of distributed LAN management. LAN NetView Manage software sits on a management console, executes systems management applications and interacts with various agents on the servers, workstations and other network devices to be controlled.

"LAN NetView is a real live management system because it gives a single view of the physical LAN, hub, routers, bridges and workstations," said Frank Dzubek, president of Communications Network Architects, Inc. in Washington, D.C. "And on top of that, it gives a logical picture of where the network operating systems are running."

Microsoft plans to give network administrators a consistent management capability via Hermes, server-based software that uses the core network management components built into Windows NT. These services include performance monitoring, event logging, user management and systems backup.

Using an administrative logon, a network manager can tap into Hermes from any workstation on the net and provide centralized support for hardware and software inventory, remote diagnostics, and control and management of network components.

Hermes also offers a systemwide software distribution capability that IBM does not offer in LAN NetView. "Having a server-based software distribution that ships software out to different types of clients is going to help Microsoft make a big splash in the management market," said Joseph Mohen, vice president of Teleprocessing Connectors, Inc. in Garden City, N.Y.

WHO SUPPORTS WHAT

At this point, LAN NetView is leading Hermes in terms of network resources supported. Users can handle DOS 5.X, Windows 3.X and OS/2 2.X clients, IBM LAN Server and Novell, Inc. NetWare file and print servers, IBM DB2/2 databases and IBM Communication Manager/2 communications servers.

Hermes will support DOS, Windows, Windows for Workgroups and Windows NT clients, as well as NT Advanced Servers.

Both platforms support Simple Network Management Protocol standards and can manage other SNMP network devices residing on the LAN.

In terms of interoperability with larger enterprise systems management platforms, IBM will offer LAN NetView Tie, an application running on top of LAN NetView that converts network events monitored by LAN NetView into Systems Network Architecture alerts and forwards them to IBM's host-based management product, NetView.

Jon Lazarus, vice president of systems marketing at Microsoft, said Hermes will connect with Hewlett-Packard Co.'s management system, HP OpenView, adding that that it was "reasonable to imagine NetView interoperability."

A big differentiator between the two platforms is shipping time. IBM will ship LAN NetView at the end of the month, while Microsoft has indicated that Hermes will not be ready until the first quarter of next year.

While roundly supported by software developers, LAN systems management has industry analysts at odds about its necessity.

Cheryl Currid, president of Currid & Co. in Houston, said the time for the distributed LAN has come. "There are some mission-critical applications being run over LANs right now," she said. "And there are large amounts of other kinds of data, company files and database records moving over those wires. If they get lost because the LAN wasn't being managed, it's going to cost a bundle in man-hours to replace."

But Tom Nolle, president of CIMI Corp. in Voorhees, N.J., said PC LAN-based systems management products are premature since few mission-critical applications now run on LANs.

"The only pervasive network management today is mainframe NetView, and all of the other stuff is a pimple on the posterior of NetView in terms of the amount of traffic that's really under management in the commercial environment," Nolle said. He added that most LANs will not be managed to that degree for at least five years.

✆ IBM: (800) 426-2468; Microsoft: (206) 882-8080.

IBM LAN Netview supporters

Allerion, Inc.'s SupportLink — remote network monitor

BGS Systems, Inc.'s BEST/1-Visualizer — monitors network performance

Dolphin Networks' ESP — Ethernet or Token Ring analyzer

Hitecsoft, Inc.'s ManageWare — automates network management tasks

Legato Systems, Inc.'s NetWorker — manages network backup and recovery

Network Telesis, Inc.'s Net-F/X — monitors network traffic

Novell, Inc.'s Netware Services Manager for OS/2 — manages Netware clients from LAN Netview console

Parallan Computer, Inc. MASS/2 — monitors server activity

ProTools, Inc.'s Cornerstone Agent — Simple Network Management Protocol agent for remote clients

ProTools, Inc.'s Foundation Manager — acts as central console for monitoring remote networks

Strategic Solutions International Corp.'s Service Point/32 — provides REXX-based automated alerts

Microsoft Hermes supporters

Attachmate Corp.'s Extra! — PC-to-Host communications

Corporate Software, Inc.'s Corporate Connection — software distribution

Corporate Software, Inc.'s Report Manager — software inventory and monitoring tool

Corporate Software, Inc.'s Utopia — remote trouble-shooting

hDC Computer Corp.'s Express Meter — tracks software licenses

NetLabs, Inc.'s AssetManager — manages Unix-based hardware and software from an NT Advanced Server station

Network Managers, Inc.'s NMC Vision — manages IBM AIX and Sun

Network Managers, Inc.'s Network Manager — Microsystems, Inc. Solaris machines from NT

Supporters of both

Computer Associates International, Inc.'s CA-Unicenter — provides security, storage, management and scheduling, data center automation and report distribution

Microcom, Inc.'s LANlord — hardware and software inventory, license tracking, virus detection and network configuration management

VisiSoft's VisiNet 2.0 — monitors network activity and presents data graphically

IBM previews work group software at show

BY BOB BROWN

Dallas

IBM's Software Solutions Division previewed four work group software technologies at Networld 93 Dallas last week that may soon emerge as products.

The technologies — addressing electronic forms, document management and application tracking software — are designed to improve productivity in work group computing environments. They are being designed to work with each other or other products, such as group scheduling systems.

"We've offered a lot of these capabilities on the host, and now we are trying to make them available on the LAN and in work group environments," said Peter Rowan, manager of LAN and AIX groupware marketing at IBM.

IBM displayed a new forms design, routing and approval application — informally called PC Forms — that will mark IBM's entree into this emerging market. The intent is to make it possible for anyone to be able to build forms for things such as travel requests and expense reports, and then establish the method in which these forms should be routed around a network. The software currently runs on OS/2 but will be ported to Windows.

IBM has offered host-based forms software in the past, said Stuart McBean, who is responsible for electronic forms strategy and product management at IBM in Dublin, Ireland. With the PC Forms software, not only will corporations be able to create corporate forms that can reside on servers, but end users will be able to create personal forms, he said.

The software, which is ready for beta testing, will enable users to employ predesigned or custom forms and distribute them via E-mail. Forms will be delivered to recipients either in OS/2 containers or E-mail inboxes.

Another IBM technology in beta and ready to hit the market early next year is the company's document management software. This software, also called library and retrieval software, is designed to let users store documents, such as word processing files and spreadsheets, on servers and then provide for managed access to those documents so that they can be edited and annotated.

IBM has been working with Saros Corp., which sells a document management server product called Mezzanine, to create the software, said John Rodriquez, an advisory application development analyst for IBM.

IBM is using the Mezzanine technology from Saros, which supports most of the major local-area network operating systems, and has developed its own client and administrative tools to work with it. Initially, IBM's software will be OS/2 based.

The administrative tools will be used to define user and work group access to documents stored on a server and provide version tracking.

IBM also demonstrated LAN administration technology designed to let administrators track application software licenses and usage from a single workstation.

IBM makes the upgrade

- Time and Place/2 2.0 — New version of IBM's local-area network group scheduling software
- Time and Place Connectivity/2 1.2 — New release of IBM's group scheduling connectivity software.
- Address Book Synchronization/2 — New product for synchronizing address books between OfficeVision/VM and LAN-based E-mail systems

SOURCE: IBM, WHITE PLAINS, N.Y.

The software, which an IBM spokeswoman said should be available within six months, includes both administrator and end-user components. The administrator component will run on OS/2 and Windows, while the client software will run on OS/2, Windows and DOS. The software will run initially in Novell, Inc. NetWare and IBM LAN Server LAN environments and will use the directories of these network operating systems to inventory resources on the network.

Administrators will be able to use the program to set limits on the number of copies of a program that can be installed or used concurrently, and see who is using what and how often.

Access rights to applications are granted by dragging and dropping icons onto an end user's name or an icon representing a group of users. The same technique is used to install software.

One other technology being demonstrated by IBM was an intelligent agent software informally called Intelli Agent.

This is client-based software that lets end users set up rules about how various information should be handled. Users can define predetermined actions to take place when certain events occur, such as an when E-mail message or phone call is received. A network manager could use the software, for example, to receive alerts via a pager when a certain network problem arises.

IBM hopes to start shipping the software on a limited based by year end for OS/2 machines.

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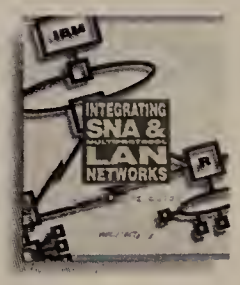

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IBM provides two ways to connect remote net nodes

BY CHRISTINE BURNS

Dallas

IBM last week announced two remote LAN access products that help mobile-minded users take the office home with them.

Unveiled at the NetWorld 93 here, were LAN Distance, software that gives remote nodes access to local-area network services, and the 8235 Traveler, a device that supports LAN access for as many as eight remote users.

"People work from home two or three days a week now, and if they don't have direct access to all the resources they have in the office, their productivity is going to go down," said Bob Roth, manager of IBM's Network Access Systems division. "With these two products, the only disadvantage the remote user has is the speed of the standard telephone line connecting them to the network."

PAUL BUCK

REISWIG

LAN Distance comprises two components. LAN Distance Remote for OS/2 sits on a remote workstation or laptop and lets the user dial into an Ethernet or token-ring LAN, or connect with other remote workstations to create a virtual LAN. It works with standard LAN adapters, a modem and dial-up lines or synchronous, asynchronous, X.25 or Integrated Services Digital Network links.

LAN Distance Connection Server sits on a nondedicated local machine and handles security and routing for as many as 32 remote nodes.

"LAN Distance fits with IBM's philosophy that the PC LAN is a strategic platform for the enterprise," said Lee Reiswig, president of IBM's Personal Software Products group. "We've stretched the LAN out to remote users."

LAN Distance enables a network manager to define access rights for remote users. Users can be associated with one or more addresses, and LAN Distance verifies the address of a calling station. Passphrases are used instead of a password.

Encryption and message authentication codes ensure that passphrases are not picked up during transmission.

LAN Distance supports all major LAN environments, including IBM's LAN Server, Novell, Inc.'s NetWare, Banyan Systems, Inc.'s VINES and Artisoft, Inc.'s LANtastic. In addition, support for Windows clients is in beta testing.

The client software costs $59, while servers cost $595 and $1,995 for eight and 32 ports, respectively. LAN Distance will be available Oct. 29.

IBM's 8235 Traveler is a plug-and-play hardware product designed so it can be integrated into existing network wiring. It sprung from a joint effort with Shiva Corp. of Burlington, Mass., under which the companies developed a multiport, multiprotocol remote access server for token-ring and Ethernet networks.

The 8235 Traveler supports as many as eight remote users over asynchronous links. Protocols supported by the 8235 Traveler include Network Basic I/O System, Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), IEEE 802.2 and Transmission Control Protocol/Internet Protocol.

Users will be able to gain remote access to NetWare servers, mainframes, IBM LAN Server machines, and Lotus Development Corp. cc:Mail and Notes applications.

Corresponding software sitting on DOS, Windows or OS/2 remote workstations lets the user dial into the server.

Jay Batson, senior analyst of network technologies at the Cambridge, Mass., consultancy Forrester Research Inc., said the 8235 Traveler is designed with the needs of network administrators in mind. "I've seen a reluctance in net managers to use PC servers as networking equipment. Network people like a box they can put in a rack and run wires to it," he added.

The 8235 Traveler costs $4,200 and $3,255 for token-ring and Ethernet networks, respectively. Client software is priced at $40. The 8235 Traveler will be available next month.

✆IBM: (800) 426-3672.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

NETWORLD® HIGHLIGHTS

SynOptics, HP boost management wares

BY JIM DUFFY AND SKIP MACASKILL

SynOptics Communications, Inc. and Hewlett-Packard Co. are looking to cash in on NetWare's market power.

SynOptics next week is expected to roll out Optivity for NMS 2.0, the latest version of its Optivity net management software for Novell, Inc.'s NetWare Management System (NMS) platform. And last week, HP unveiled two management applications that allow users to govern NetWare environments from a centralized OpenView console.

The new Optivity for NMS adds two major features, including an autotopology feature that will automatically locate SynOptics hubs installed in the NetWare environment and a nodal view function that will compile data from those hubs into a single logical view.

The autotopology feature will let Optivity pinpoint SynOptics equipment on the net and integrate data about the devices into NMS' database, automatically adding them to NMS' topology map.

The nodal view feature allows Optivity to explore each local-area network segment, discovering attached devices and how they are connected within the hub. The application combines data about the devices into a single logical view that provides a host of information, including which station is generating the most traffic and what errors are occurring across the net.

Optivity for NMS 2.0 will be out in December. Pricing has not been set but is expected to be in the $3,500 range.

The HP applications are collectively dubbed OpenView Node Manager for NetWare and run on Unix-based OpenView consoles. They allow network administrators to automatically discover NetWare clients and servers, and represent them on an OpenView map. They also allow the administrator to monitor clients and servers in real time, receive alerts and issue commands.

The applications work with NetWare management agents running on NetWare 3.X servers as NetWare Loadable Modules (NLM). The agents support proxy agents that gather information from clients.

The management application for NetWare clients is called OpenView Node Manager for NetWare Stations. This application collects hardware and software inventory information and stores it in an SQL database or spreadsheet. It also monitors clients for disk usage, memory consumption, and hardware and software configurations.

HP's OpenView Node Manager for NetWare Servers allows network managers to monitor server CPU utilization, the number of users and connections to each server, memory usage and available disk space, as well as graphically depict this data on OpenView.

The servers generate alarms based on user-defined performance and utilization thresholds. When an alert is received, the OpenView console can be programmed to automatically dial the pager of the appropriate network administrator. Also, the console operator can add or delete users, broadcast messages on the status of the server, reboot any server, change passwords and load or unload NLMs.

OpenView Node Manager for NetWare can be used with Novell's NMS agents for NetWare 3.X and 4.X servers.

OpenView Node Manager for NetWare Stations costs $6,750 and will be available in December. OpenView Node Manager for NetWare Servers costs $7,750 and will ship in February.

✆SynOptics: (408) 988-2400; HP: (408) 447-1665.

Full-duplex Ethernet effort draws lukewarm response

BY SKIP MACASKILL

Dallas

Cabletron Systems, Inc. and Kalpana, Inc. last week made a big push to increase awareness and adoption of full-duplex Ethernet, but they got a cool response from the top two suppliers of Ethernet adapters.

Full-duplex Ethernet, which requires Ethernet switching to work, disables Ethernet's collision detection feature, allowing end stations to simultaneously send and receive data across two 10M bit/sec paths. The technology holds promise for users with bandwidth constraints or looking to deploy new multimedia applications.

At last week's NetWorld 93 Dallas, Cabletron announced the formation of a vendor consortium to ensure compatibility of full-duplex products, while Kalpana actually demonstrated interoperability between its Ethernet switch and adapters from IBM and Compaq Computer Corp.

Members of the Cabletron-led consortium agreed to develop and deliver interoperable full-duplex products that use the same access method. Cabletron and the seven other vendors that in the consortium — Compaq, IBM, Kalpana, National Semiconductor Corp., NCR Corp., SEEQ Technology, Inc. and Texas Instruments, Inc. — agreed to use the same automatic detection mechanism until a standard is agreed on by the IEEE 802.3 committee.

The mechanism, which is a link-test pulse routine, will allow a hub to automatically sense whether an installed network interface card (NIC) can handle full duplex.

Despite the enthusiasm of Kalpana and the consortium members, the leading Ethernet adapter suppliers were less than impressed. "Full duplex is the latest Ethernet du jour," said Lance Murrah, vice president of marketing at Standard Microsystems Corp. (SMC). "There is zero interest in it from our users. I don't see it being enough of a benefit to warrant swapping out adapters and upgrading hubs."

3Com Corp. was noncommittal. "We're looking at it and think it may be feasible, but we're really focusing on 100M bit/sec Ethernet," a spokeswoman said.

Full-duplex proponents, however, were quick to point out the technology's benefits. "You don't need more speed to increase performance," said Larry Blair, vice president of marketing at Kalpana. "Full-duplex capabilities will let users extend the functionality of their switched environments by increasing network capacity and server availability."

Kalpana announced it had completed interoperability testing of its EtherSwitch with available IBM's EtherStreamer MC 32 adapter and Compaq's NetFlex family of 32-bit NICs.

The immediate benefits can be seen at the server level, where full duplex will reduce I/O bottlenecks. The technology can also be used to link two hubs or Ethernet switches, allowing traffic to be exchanged more quickly.

Full duplex could also be used at the desktop to support multimedia applications.

Eagle Technology, Inc. supports the moves made by both Kalpana and Cabletron. Eagle, which ranks third in the Ethernet NIC market, has not announced full-duplex products but is likely to do so in the future.

"We welcome the [Kalpana and Cabletron] moves because full duplex is a low-cost way to improve performance," said Dave De Puy, vice president of product programs at Eagle. "While fast Ethernet is a valid technology, it is not standardized yet and products don't exist."

Analysts were skeptical about full-duplex in light of emerging higher speed technologies that will debut around the same time.

"Is there enough value in a full-duplex Ethernet offering in light of fast Ethernet and falling FDDI prices?" asked Sam Shuler, a principal in the Dallas office of The Yankee Group, a consulting firm based in Boston. "There might be if it's a seamless, free-of-charge upgrade, but changes to hubs and adapters might negate any improvements."

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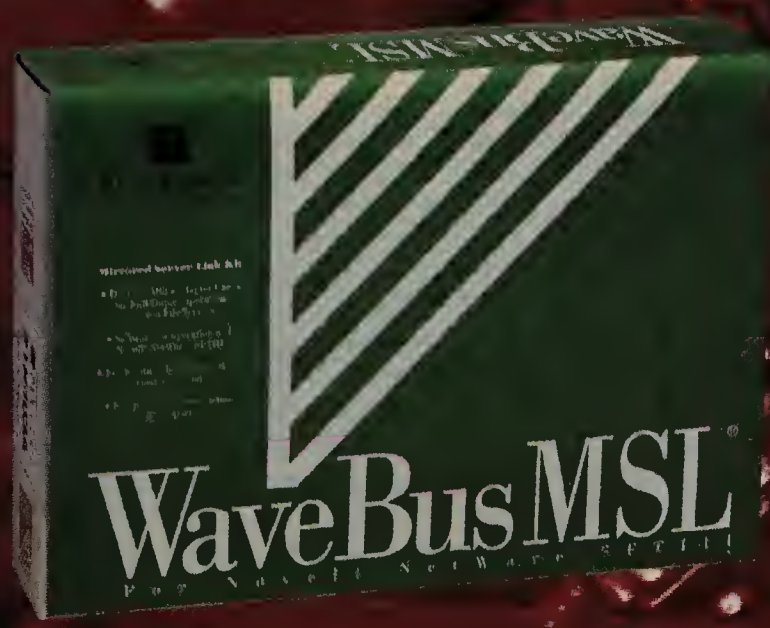

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RIDE WITH THE WINNER CATCH THE WAVE WITH PLAINTREE SYSTEMS

Supercomputing firm to tie in nationwide users via ATM

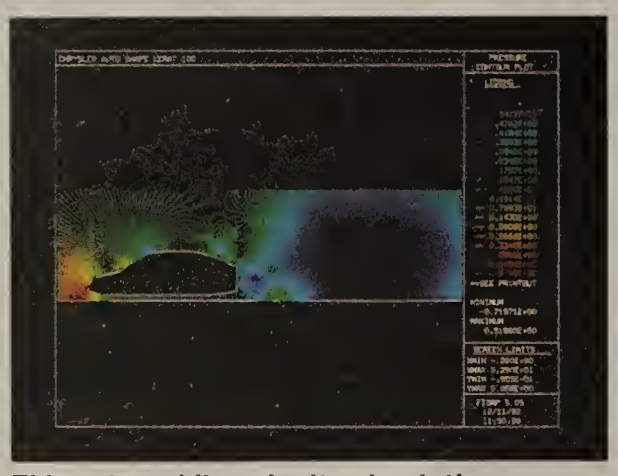
Will extend fat data pipes out to the desktop.

BY BILL BURCH

Minneapolis

If you're hungry for more raw computing power, the Minnesota Supercomputer Center, Inc. (MSC) is ready to toss a few gigaFLOPs your way over Sprint Corp.'s ATM network.

MSC and Sprint last week announced a joint marketing agreement meant to give users more flexible access to the center's machines over the Sprint Asynchronous Transfer Mode (ATM) network, promoting interactive use of MSC supercomputers for work on advanced simulations.



This automobile velocity simulation was run on an MSC machine as part of a high school's fluid dynamics lab.

Established in 1982, MSC has 80 employees and $25 million in annual revenue. It also claims to be the nation's only private supercomputing services center. Academic, government and industrial customers from around the country use the center's three Cray Research, Inc. parallel vector systems and two Thinking Machines Corp. massively parallel systems for applications such as the 3-D modeling of DNA, seismological formations, architectural structures, and aircraft and spacecraft prototypes.

In the past, customers running such applications from remote sites have connected to the center via Transmission Control Protocol/Internet Protocol links at T-1 speed and below. But those wide-area network data rates have lagged behind the supercomputers' I/O speeds, resulting in a bottleneck that has kept remote users from making full use of the machines, MSC President John Sell said.

"Science is by nature an iterative process," Sell said. "You really can't do very good science if you only iterate once in a while."

Boosting a connection's data rate can end the bottleneck, but that gets expensive, especially since the volume of I/O traffic is highly variable, leaving the circuit underused much of the time. ATM, however, can accommodate high data rates while holding down costs with per-packet pricing.

Initially, ATM connections to the supercomputers will run at 45M bit/sec, but that rate will be boosted as Sprint deploys Synchronous Optical Network (SONET) throughout its network over the next few years. MSC is already using Sprint's ATM service to connect to the Advanced Research Projects Agency's Multidimensional Applications and Gigabit Internetwork Consortium (MAGIC) testbed. That connection will climb to the Optical Carrier-3 and OC-12 rates of 155M and 622M bit/sec early next year. The MAGIC backbone, which will support the OC-48 speed of 2.4G bit/sec, is scheduled to be up within a month.

To connect to the net, customers and MSC will need an ATM interface for their router or other communications equipment. Such interfaces are starting to hit the market from vendors such as Fore Systems, Inc., which is shipping an ATM interface for its ForeRunner family of ATM switches. Others, including Cisco Systems, Inc. and StrataCom, Inc., are expected to follow suit later this year. Bill Grant, MSC's vice president of networking services, declined to say whose ATM equipment MSC will use.

MSC is now discussing the new service with prospective beta users. The center's goal is to attract customers by providing real-time integration of supercomputing into clients' local work environments, Grant said.

"What our customers really want going forward is to use the high-performance computing capability as though, in essence, it's on their desk," he said.

So far, the center's private sector customers for the most part have been Fortune 500 companies. But the center is hoping to bring in smaller companies with industry-specific application packages for vertical markets, including aerospace, automotive and health care.

Prototype application packages for those industries will be available in the first quarter of 1994, followed by wider deployment in mid-1994.

NetWorth details next-generation hub direction

BY SKIP MACASKILL

Dallas

NetWorth, Inc. last week provided a glimpse into its future when it displayed a prototype of its next-generation hub at the NetWorld 93 trade show here.

The NetWorth Series 6000 is a multigigabit-capacity device that will provide integrated switching and Asynchronous Transfer Mode (ATM) capabilities in addition to support for the traditional token-ring, Ethernet and Fiber Distributed Data Interface networks.

A key component of the new device will be the Network Services Engine (NSE), which will serve as a high-end personal computer platform supporting a variety of network services.

Users, for example, could load Novell, Inc.'s software-based MultiProtocol Router onto the platform, as well as applications for net management and local-area network-to-host connectivity.

A key component of the new device will be the Network Services Engine, which will serve as a high-end PC platform.

The NSE will be a revamped version of the NetWare Application Engine (NAE) processor module found in existing Series 4000 hubs. It will be housed in a drawer that occupies the bottom half of the 10-slot 6000 and be based on an Intel Corp. 80486DX2 microprocessor.

Last week, NetWorth also rolled out HubWare, a series of NetWare Loadable Modules (NLM) that run on the 4000's NAE. Initial HubWare offerings will include the local- and wide-area version of MPR and a NetWare for SAA gateway. The applications range in price from $495 to $6,995 and are available now.

It is expected that the HubWare products will also be able to run in the NSE, giving users access to more than 30 applications and services via NLMs.

Because the NSE is housed in a separate compartment, it will not take up any slots, unlike the current NAE, which requires two slots in the 4000. The NSE connects to the 6000's backplane and management bus, so it can be used to compile net management information about the segments and devices attached to the 6000, eliminating the need for a management module.

The NSE, which is field-upgradable to Intel's Pentium chip, also offers five drive bays and 10G bytes of storage. A stackable version of the NSE is under development that will be geared to remote office environments.

"Users can load the needed server and routing software onto the NSE, creating a branch in a box that could be shipped out to a remote site, where technical support staff is usually nonexistent," said Phyllis Dyer, the 6000's product-line manager.

Since management functionality has been offloaded to the NSE, all 10 of the 6000's slots can be used for a variety of interface modules. The 6000, which features dual power supplies for redundancy, will also support existing 4000 modules.

According to Dyer, the 6000 will feature integrated switching and ATM functionality, but the company has not made the final determination on how that will be incorporated into the device.

The 6000 will be officially unveiled in either late November or early December and ship soon after that. Pricing has not been determined.

✆NetWorth: (214) 929-1700.

NET RELIABILITY

AT&T to offer a series of diverse routing options

BY BOB WALLACE

Basking Ridge, N.J.

AT&T last week announced two diverse routing options for users that want to minimize the effect of natural and man-made disasters on high-speed AT&T private-line networks.

Enhanced Access Diversity (EAD) provides users with diverse access links to the carrier's net, and Enhanced Diversity Routing Option (EDRO) offers diverse interoffice trunks.

"End-to-end circuit reliability is the top service attribute that customers ask us for and worry about," said Hemant Vaidya, a division manager for AT&T's Accunet T1.5/T45 services. "We think we've found a solution."

Firms that combine EAD and EDRO will pay for the backup lines and $15 to $30 more a month per redundant link. AT&T will provide circuit routing maps to show where link diversity has been implemented. The carrier also promises to make sure the diverse circuit's routing arrangement isn't changed.

Although AT&T has previously provided diverse local and long-haul links on a customer-specific basis, diversity has not been offered to all users via a general tariff.

To offer EAD, AT&T will access a central database it owns and maintains that contains information about diverse routing options local carriers offer and initiate orders for the separate links.

Vaidya said the database contains data for territories served by Pacific Bell, US West, Inc. and GTE Corp. AT&T expects to have the same information for other local carriers — including alternate access services providers — by year end.

"What you're buying with EAD is a diversity guarantee," said Daniel Briere, president of TeleChoice, Inc., a Verona, N.J., consultancy. "In the past, the routes that diverse circuits took were often changed when the carrier had to route around a problem or reengineer its net. Most users had no way of knowing whether or not the original diverse routes were changed over time."

EAD offers three levels of diversity protection: Silver, Gold and Platinum. With Silver, AT&T provides separate circuits from the user's local central office through separate paths to two different AT&T points of presence (POP). Gold offers the same thing but takes it a step further by offering redundant links from the local central office to the customer site.

With Platinum, AT&T provides users circuits that run from the customer's location to two separate AT&T POPs, with no common offices.

There are some shortcomings with Silver and Gold. In both cases, the diverse links go through the same central office. So if that facility is knocked out — as has been known to happen — users would lose both links.

Although AT&T is pitching EAD as a means of supporting diverse routing, the carrier admits that EAD circuits can be physically separated by as little as 25 feet in some cases. That means that two circuits running across the same stretch of land or along railroad right-of-ways could, for example, be cut by what AT&T calls "a fiber-seeking backhoe," or work crew.

For users seeking diverse routing for the interoffice segment of AT&T private-line links, the carrier offers EDRO. With EDRO, AT&T runs traffic over paths that are separated by at least 100 feet and avoid common AT&T buildings.

EDRO will be available to users of the carrier's T-1, fractional T-3, T-3 and the carrier's recently announced Accunet T32 service. EAD, EDRO for fractional T-3 and T32 are scheduled to become available Oct. 15, pending Federal Communications Commission approval.

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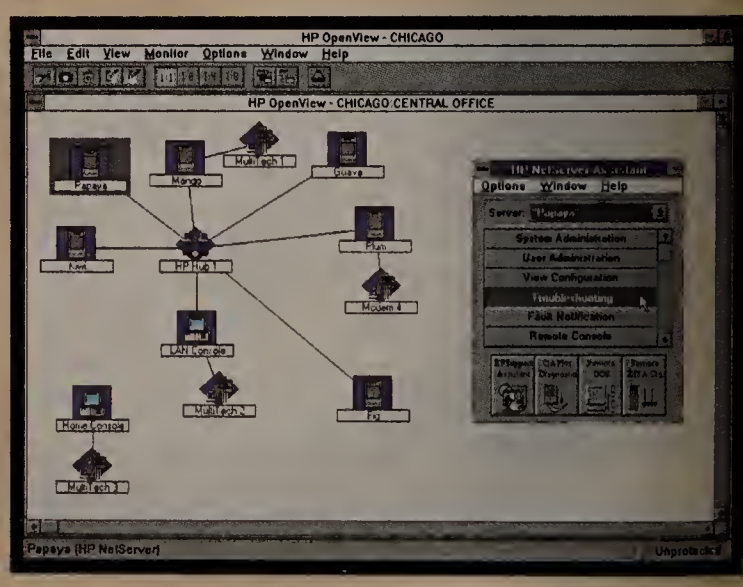

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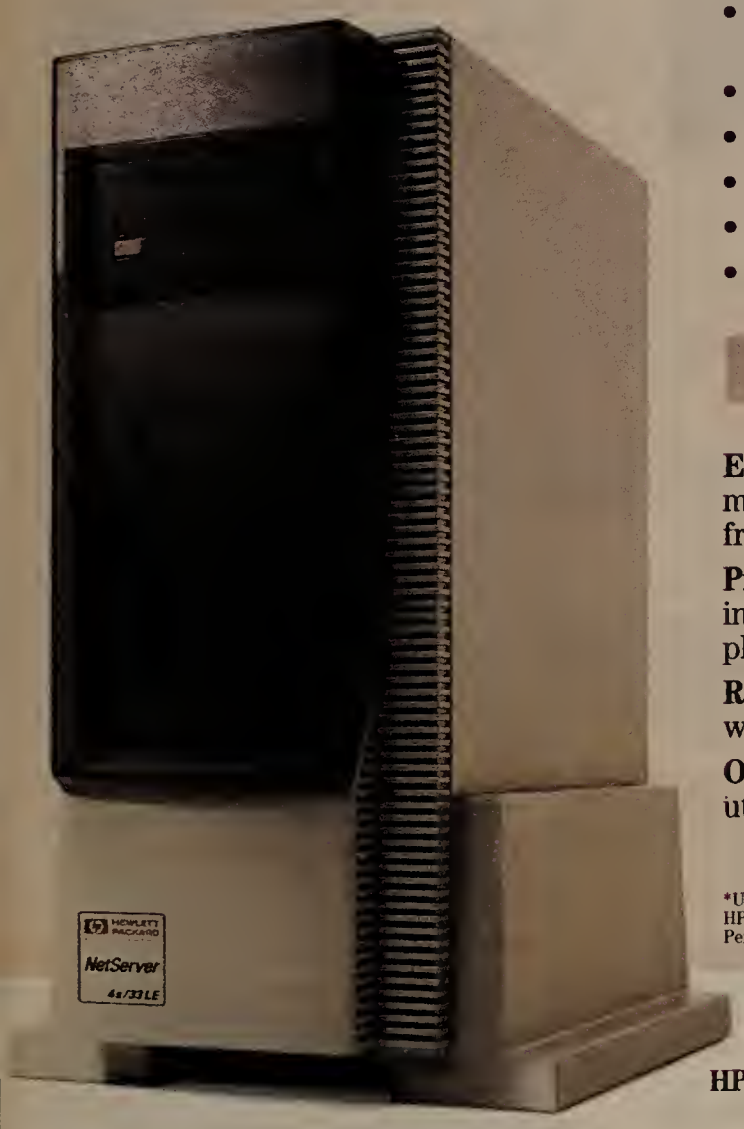

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*U.S. list price for HP NetServer LM Model 530, including 486/33DX processor, 16-MB RAM and 535-MB SCSI hard drive.**U.S. list price for HP NetServer LE Model 240, including 486/33SX processor, 4-MB RAM and 240-MB IDE hard drive. Prices subject to change without notice.

HP NetServer LE

HEWLETT PACKARD

NET includes low-end multiplexer in IDNX line

BY MAUREEN MOLLOY

Redwood City, Calif.

Network Equipment Technologies, Inc. (NET) last week announced Micro 20, a low-end version of its IDNX T-1 multiplexer that will provide users at smaller sites with integrated support for LAN routing, frame relay and digital voice links.

Rick Malone, a principal at Vertical Systems Group in Dedham, Mass., said Micro 20 is a much-needed addition to NET's product portfolio. Today, the company supports users' low-end requirements employing ADNX 48, a channel bank the firm acquired through an OEM agreement with CoastCom, Inc. that supports standard D4 framing and formating. While the device can be linked to an IDNX, it does not support NET's proprietary signaling.

The new Micro 20 supports the proprietary features offered by the IDNX, such as fast rerouting of channels, on-demand bandwidth allocation and full control down to the access interface.

"Customers have been asking for a low-end extension to the IDNX for a long time," Malone said.

With a price tag starting at $8,500, the newest member of the IDNX family provides users "with IDNX functionality at access node prices," said George Hunt, IDNX product manager.

The IDNX Micro 20 is an eight-slot device that supports as many as seven communications modules, with the eighth slot reserved for the processor card. It supports: circuit and packet switching, as well as frame relay switching and services; a maximum of 360 digital or 24 analog voice channels; and 24 data circuits at speeds up to 64K bit/sec, or 12 data circuits at speeds up to 1.54M bit/sec.

The device can be equipped with NET's LAN/WAN Exchange multiprotocol router — which enables users to link dispersed Ethernet or token-ring local-area networks — and later will be outfitted with an interface to support Asynchronous Transfer Mode traffic.

"Customers have been asking for a low-end extension to the IDNX for a long time," Malone said.

The IDNX Micro 20 includes distributed network control and routing capabilities that enable it to reroute calls in the event of an equipment failure.

The device can be managed from NET's Series 5000 and NetOpen/5000 network management systems, enabling remote locations to be controlled from a central site. In addition, the network can use NET's Expert Fault Management System, NetOpen/EFMS, to enhance network reliability and minimize management costs.

The IDNX Micro 20 is available now.

SEGMENTING LARGE NETS

The company will also announce by early next year new software capabilities for the IDNX line that will enable users to logically partition large nets, regardless of geographical location.

While declining to provide complete details, NET said the so-called Supernet software will let users segment enterprise nets into domains that consist of 250 nodes, thereby providing better control and net management capabilities. Networks will be able to have as many as 16,000 Micro 20 and IDNX nodes.

The software will allow users to partition large networks by division or department, and let these groups control their portion of the network.

According to Hunt, the concept is similar to local exchange carriers' local access and transport areas but without the geographical limitations. "Users can segment their network into smaller nets much like a common carrier does and have traffic pass from one domain to the next," he explained.

NET will be the second mux vendor to offer such capabilities for large nets. Newbridge Networks, Inc. announced two years ago its Views software package that enables its 4602 Network-Station net management systems to logically divide management of networking according to user criteria (*NW,* Sept. 2, 1991, page 1).

An enterprise internet, for instance, could be logically separated from a voice net, with responsibility for each given to different administrators.

✆NET: (415) 366-4400.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

AT&T's frame relay NOC.

Frame relay

Continued from page 1

customer's frame relay network.

Armed with diagnostics systems created by AT&T's Bell Laboratories unit, they look to spot circuit degradation and congestion before service is interrupted. The NOC staff helps users analyze reports, evaluate network performance and plan for future requirements.

The NOC is used to oversee a frame relay net consisting of an unspecified number of StrataCom, Inc. IPX 32 fast packet T-1 multiplexers linked via high-speed trunks. It is available through 200 points of presence and in 16 Western European countries.

A benefit of frame relay — and a reason for its growth — is its dynamic nature. Unlike private lines, which offer a fixed amount of bandwidth, frame relay enables customers to burst above the amount of wide-area net capacity for which they have contracted.

Customers typically use dedicated links — anywhere from 56K to 1.544M bit/sec — to access the service and then sign up for the amount of wide-area transport bandwidth they need, which is called the committed information rate (CIR). Brand said the typical CIR for a 56K bit/sec access link is 32K bit/sec.

ANDERSON

If the access port speed is greater than the CIR, customers can burst above the CIR on an as-needed basis, up to the maximum speed of their access links. This saves users money by eliminating the need to engineer for peak demands.

Brand's rule of thumb is that the higher the ratio of the port speed to the CIR, the bigger the cost benefit when compared to private lines.

While bursting above the CIR is a common benefit of many frame relay services, AT&T has taken it a step further by working with StrataCom and Bell Laboratories to develop a way to sustain transmissions above the CIR rate when net bandwidth is available.

The trio developed IPX software, called ForeSight, which AT&T has installed on all of its StrataCom switches. Before ForeSight, AT&T only let users burst above their CIR for milliseconds. With ForeSight, users can sustain bursts above their CIR for several hours.

"We can save money by lowering our CIR and let the [ForeSight software] handle the long bursts," said Dennis Anderson, director of computing services with LSI Logic Corp., AT&T's first frame relay user.

The Milpitas, Calif., vendor originally signed up for 256K bit/sec CIRs to send large computer-aided design and manufacturing files from numerous design centers to its headquarters. It has sinced dropped many of those to 126K bit/sec because ForeSight enables LSI to sustain bursts of 135% above its CIR.

AT&T is the first carrier to implement ForeSight networkwide, though WilTel and CompuServe, Inc. are both testing the software.

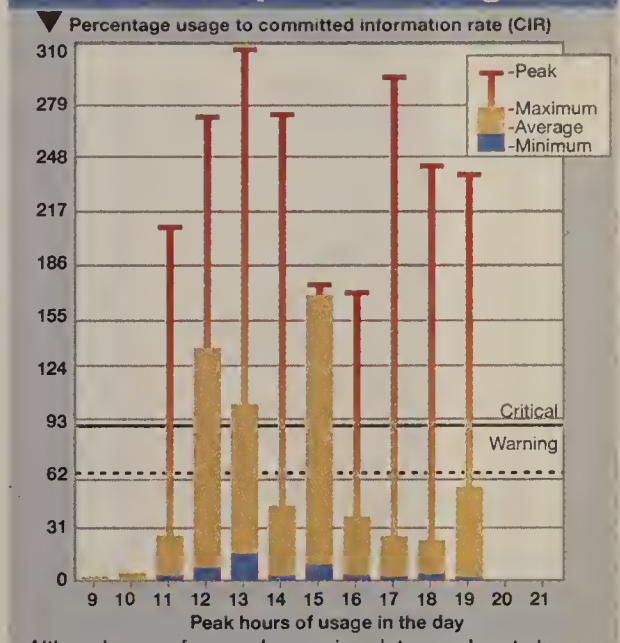
In the future, AT&T will replace the frame relay backbone with Asychronous Transfer Mode (ATM)-based switches (see story, this page). David Nelsen, AT&T's ATM product manager, said the plan is to move the StrataCom IPXs to the periphery of the net. Once there, the IPXs will pass frame relay frames to Stratcom BPX ATM switches.

The BPX switches will accept frame relay frames and ATM cells from users and pass them to a backbone network of high-end AT&T Network Systems GCNS-2000 ATM switches.

Nelsen said the Frame Relay Forum will soon ratify the frame-cell interworking specification that delineates a way to encapsulate frame relay frames in ATM cells and said the rise of ATM will not mean a fall for frame relay.

The carrier will further discuss the future of its frame relay service when it formally announces details of its ATM service later this month.

AT&T's InterSpan frame relay service report for LSI Logic



Although many frame relay services let users burst above their CIR, AT&T's InterSpan offering lets LSI Logic sustain bursts above the CIR for extended periods, providing peak peformance at low cost.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: LSI LOGIC CORP., MILPITAS, CALIF.

> ***"We don't want users to think that our ATM plans don't include ongoing support for frame relay...That's clearly not the case. Frame relay has a very bright future."***
>
> **David Nelsen, AT&T's ATM product manager**

AT&T details its ATM services plans

AT&T is expected to formally announce its Asynchronous Transfer Mode (ATM) service strategy later this month, a 45M bit/sec offering the company had originally previewed last February.

The service, expected to be in controlled introduction early next year, will be provided on a network of StrataCom, Inc. BPX and AT&T GCNS-2000 cell relay switches and will support voice, video and bursty data traffic.

David Nelsen, AT&T's ATM product manager, said AT&T will initially offer Class A and Class C ATM services and may eventually add Class B and Class D offerings, but would not say when.

Nelsen said Class A service — which is connection-oriented, has a constant bit rate and has minimal, consistent delays — will support voice and video traffic. Class C service, which is also connection-oriented by allowing for variable bit rates and variable frame delays, will support data applications.

Although Nelsen said data applications will be the driver for ATM services early on, he added that voice will play a key role in the evolution of ATM.

"As we look forward, we see that voice is a big part of ATM," said Nelsen. "We see voice coming in from our PBXs, which will have an ATM interface, and as sound for multimedia applications."

AT&T's Class C ATM service will support applications including local-area network interconnection, imaging, visualization, computer-aided design and manufacturing and host-to-host data communications, Nelsen said.

AT&T said it also expects that users will show some interest in Class D service — a connectionless, variable bit rate data offering — and will be positioned to fill that need.

"With Class D service, equipment doesn't have to do anything to establish a connection," Nelsen said. "[Devices] can simply drop addressed cells into the network and away they go."

Nelsen said Class D service is best suited for firms that have many LANs but don't want to provision connections from every point to every other endpoint. "If communications between endpoints is infrequent, a connectionless service is best."

BY BOB WALLACE

ATM standards defined by CCITT

	Class A constant bit rate service	Class B variable bit rate service	Class C connection-oriented data service	Class D connectionless data service
Applications	Voice clear channel	Packet video	Data	
Connection mode	Connection-oriented			Connectionless
Bit rate	Constant		Variable	
Performance	Requires consistant delay		Variability acceptable	

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: AT&T, BASKING RIDGE, N.J.

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I certify that the statements made by me above are correct and complete.

Pat Walker
Traffic Manager

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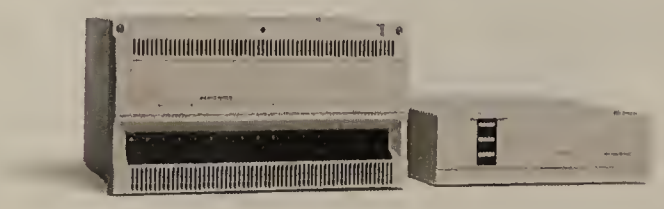

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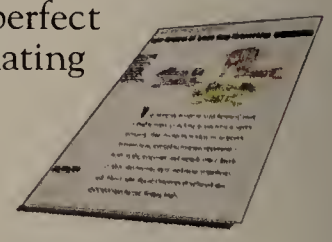

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RACAL

APPN implementors get down to business

Using HRP to lift APPN from its doldrums.

BY MICHAEL COONEY

Raleigh, N.C.

Getting down to the nitty gritty.

That's how IBM and the vendors attending its most recent APPN Implementor's Workshop (AIW) describe current development efforts surrounding IBM's Advanced Peer-to-Peer Networking (APPN).

Gone, but not completely forgotten, are past troubles with licensing fees, Cisco Systems, Inc.'s failed attempt to lead an APPN alternative — Advanced Peer-to-Peer Internetworking — and a general industry malaise over the future of APPN technology.

"There is more of a feeling of getting down to work and getting things done without the bickering, positioning and distractions of the past," said Louise Herndon Wells, director of Systems Network Architecture internetworking at the Internet Technical Institute consultancy in Milpitas, Calif. Wells also chairs the Data Link Switching (DLSw) special interest group within the AIW.

For example, the AIW meeting held here Sept. 27-29 saw many specifications fall into place that will be key to APPN's future.

IBM made its APPN High Performance Routing (HPR) specification available for the first time to all of the AIW. HPR will bring dynamic rerouting around failures, much better performance, and improved data flow control and class of service features to existing APPN technology.

By the end of 1994, IBM expects to have HPR implemented in major products, including the Application System/400, 3174 Establishment Controller, Communications Manager/2, VTAM, the front-end processor's Network Control Program, the 6611 multiprotocol router and 3172 Interconnect Controller. HPR is considered by most industry observers as the key to APPN's success because it eliminates the main differences between APPN and its chief competing technology, Transmission Control Protocol/Internet Protocol.

There was so much interest in HPR that the AIW decided at last month's meeting to immediately form a special interest group, whereas normally a new specification would have to go through a shakeout period of several months to a year before one is formed.

"The interest in developing HPR is so great right now that much of the work could be done on it before the next meeting [in February] and it could be implemented in third-

See **APPN**, *page 16*

APPN and TCP/IP square off

Advanced Peer-to-Peer Networking (APPN)	TCP/IP
APPN focus: Promote peer networking	TCP/IP focus: Foster multivendor interoperability
Reduces line cost	Reduces systems cost
Requires connection-oriented data link	Connectionless data link
No subnetwork support*	Supports multiple subnetworks
Supports prioritization and class of service, depending on data or protocol type	Can support class of service techniques, but not often implemented
Cannot dynamically reroute around failures*	Supports dynamic reroute around failures
Performs well with heavy data load	Performs better when not under heavy volume constraints
Network names not user-friendly or descriptive	

* Enhancements expected in 1994 will address these issues.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: VEDACOM CORP., SEATTLE

BRIEFS

Coastcom, Inc. last week announced Fracdial, an inverse multiplexer aimed at providing low-cost videoconferencing and LAN-to-LAN interconnections. Using switched digital links, Fracdial supplies dial-up bandwidth at speeds up to T-1 in any 56K or 64K bit/sec increments. The device is equipped with an integrated Virtual Bridge that enables users to conduct videoconferences with multiple remote sites simultaneously.

Fracdial, which can be configured in stand-alone mode or behind a private branch exchange or any other digital device that supports a DS1 signal, costs $7,995. The optional Virtual Bridge costs $2,500 and is available now.

Coastcom: (510) 523-6000, Ext. 303.

Simware, Inc. last week rolled out software designed to make it easier for remote PC users to link to Systems Network Architecture mainframe or Transmission Control Protocol/Internet Protocol server resources.

A2B comprises client software that resides on a Windows-based personal computer and a server program that resides on the mainframe or Unix server. Using an icon-based menu, users can establish 3270 sessions with the mainframe via asynchronous or X.25 nets. For companies with TCP/IP servers, A2B supports Telnet and TN3270 emulation.

A2B is available for prices starting at $295.

Simware: (613) 727-1779.

ADC Kentrox last week announced its WANCard NW1544, an integrated data service unit (DSU) for Novell, Inc.'s Multiprotocol Router Plus (MPR) that provides access to frame relay networks over T-1 links. The vendor said the DSU will also support the Point-to-Point Protocol and X.25 protocols in the future.

The WANCard is available for Industry Standard Architecture-bus personal computers, with one port supporting an RJ-48 public network T-1 or fractional T-1 interface. Also included are software drivers that provide NetWare-integrated Simple Network Management Protocol management and configuration.

The WANCard NW1544 costs $1,695 and will be available next month.

ADC Kentrox: (503) 643-1681.

Wellfleet beefs up low-end AFN nodes

BY MAUREEN MOLLOY

Billerica, Mass.

Wellfleet Communications, Inc. last week expanded its family of low-end multiprotocol routers and added enhancements to existing models that make them easier to configure.

The Access Feeder Node (AFN) router line now includes a new model that supports two token-ring and two synchronous connections at up to T-1 speeds. With the two local-area network ports, the product can provide local- and wide-area routing as well as source route bridging.

Wellfleet's existing access router line consists of one device that supports one Ethernet and two synchronous wide-area network interfaces in addition to another that supports one token-ring and two synchronous interfaces.

All three routers can be configured to tie a local Synchronous Data Link Control device and an Ethernet or token-ring LAN to a corporate internet via the other synchronous port.

Alternatively, the two synchronous ports can be used to provide redundant backbone connections, load sharing or added bandwidth to a single backbone site.

The new AFN is based on a Motorola, Inc. MC68030 microprocessor and is equipped with 4M bytes of random-access memory, 1M byte of which is

See **Wellfleet**, *page 16*

Citicorp's global internet progressing

BY JIM DUFFY

Long Island City, N.Y.

Citicorp is about halfway through its massive netupgrade aimed at consolidating 100 nets into a one.

Company officials said they have melded about 46 of those networks, representing about 221 T-1, 56K, 19.2K and 9.6K bit/sec dial-up and leased data circuits, into the Citicorp Global Information Network (CGIN). CGIN is an Internet Protocol router-based internetwork that will link between 50,000 and 80,000 employees across 3,500 sites in 93 countries (*NW*, Nov. 18, 1991, page 4).

Key components of the project include middleware the company is developing for distributing financial and work group applications across CGIN, as well as a revamped network management operation to ensure CGIN's uptime and availability.

Citicorp has installed 220 to 250 routers worldwide, forming the CGIN backbone.

CGIN, scheduled for completion in late 1994, is intended to provide Citicorp's varied financial service businesses with a common network infrastructure to foster distributed, client/server computing and reduce telecommunications costs. It also promises to simplify net administration, operations, and application and product development.

To date, Citicorp has installed between 220 and 250 routers worldwide to form the CGIN backbone, which runs at speeds from 56K bit/sec to T-3.

The routers, from a vendor Citicorp declined to disclose, will support a slew of network protocols, including IBM Systems Network Architecture, Digital Equipment Corp.'s DECnet, Novell, Inc.'s Internetwork Packet Exchange (IPX) and Transmission Control Protocol/IP. They will also support frame relay interfaces for access to public and private frame relay nets, as well as access to other switched services for dial-up restoral of failed circuits and bandwidth on demand.

But CGIN's real payoff will come with its ability to support the bank's applications. Citicorp's middleware, called Network Application Program Interfaces (NAPI), will allow the firm's application developers to write portable financial service and work group applications that work with various transport protocols and interprocess communications mechanisms.

With NAPIs, application developers will not have to worry about how to bridge one business network to another in order to share information, said Charanjit Singh, vice president of Citicorp International Communications, Inc., the Citicorp business unit that manages CGIN.

NAPIs will also play a key role in managing CGIN because they will facilitate the development of distributed applications that allow Citicorp's management systems to easily share information.

Chief among those management systems is MAXM Systems Corp.'s MAXM, which Citicorp is deploying in its several network operation centers. MAXM is an integrated, automated voice and data network management system that runs on IBM Personal

See **Citicorp**, *page 16*

HOST ACCESS

Wall Data links host access packs in RumbaOffice

BY JIM DUFFY

Redmond, Wash.

Wall Data, Inc. last week announced RumbaOffice, software that allows users to access applications on multivendor host computers via a single Windows interface.

RumbaOffice is a client-based software package that combines the functions of three Wall Data products — Rumba for the mainframe, Application System/400 and VAX. It also allows Windows users to establish terminal sessions with IBM, Digital Equipment Corp. and Unix hosts.

"It's one product to access multiple applications wherever they are in a network," said Carl Peede, manager of product marketing for Wall Data.

RumbaOffice includes a number of features that allow users to organize and manage access to and interaction with host computers. RumbaOffice Manager, for example, lets users group Rumba applications — represented as icons on a Windows screen — with other Windows icons and launch all of those programs simultaneously via a click of the mouse.

For example, a user may want to bundle an AS/400 terminal-emulation application with a spreadsheet operation to simultaneously update the spreadsheet with information gleaned from the AS/400 session.

RumbaOffice also includes a batch drag-and-drop file-transfer capability. This lets users set up a list of files to be transferred, drag them from a Windows File Manager and drop them into a Rumba session to initiate a file transfer.

Another feature, Configurable Rumba, allows network administrators to authorize or block access to specific RumbaOffice functions, depending on the user's needs.

RumbaOffice also includes a Floating ToolBar. This lets users position the tool bar of Rumba commands, usually at the top of the window screen, anywhere on the Rumba screen.

For IBM connectivity, RumbaOffice supports IBM's Advanced Program-to-Program Communications and PU Type 2.1, which lets users communicate with other RumbaOffice users and as peers with any other PU 2.1 nodes without going through the host.

Wall Data's RumbaOffice

- Gives users access to applications on multiple hosts from a single Windows interface.
- Combines separate Wall Data Rumba products for IBM mainframes and AS/400s, and Digital Equipment Corp. VAX processors.
- Costs $500 per single-user license and is available now.

SOURCE: WALL DATA, INC., REDMOND, WASH.
GRAPHIC BY SUSAN J. CHAMPENY

The product also supports IBM's Advanced Peer-to-Peer Networking (APPN) End Node, which means the Windows client can automatically register itself in an APPN network and communicate as a peer with all other APPN nodes.

RumbaOffice includes the latest version — Level 1.2 — of IBM's Common Programming Interface for Communications (CPI-C), an APPC application program interface. CPI-C Level 1.2 supports multiple incoming calls from one application to another, instead of one session at a time.

Lastly, the product supports IBM's Enhanced Non-Programmable Terminal User Interface, which offers a graphical user interface to AS/400 5250 sessions instead of a command-line interface.

RumbaOffice costs $500 per single-user license and is available now.

Eicon unveils asynchronous SNA gateway, WAN support

BY MAUREEN MOLLOY

Dallas

Eicon Technology Corp. last week announced WAN services for NT, a hardware and software combination that connects Microsoft Corp.'s Windows NT-based machines to wide-area X.25 and SDLC lines and, eventually to ISDN and frame relay networks.

The vendor also announced at NetWorld 93 Dallas an asynchronous Systems Network Architecture gateway that will provide remote users with dial-up connectivity to IBM mid-range and mainframe hosts.

WAN Services for NT essentially provides Microsoft's software-only mail programs, SNA Server and Remote Access Server (RAS) with wide-area networking capabilities. SNA Server is Microsoft's SNA gateway, while RAS is a Microsoft product that enables stand-alone personal computers to access a remote local-area network via an asynchronous link.

A WAN Services for NT card provides SNA Server support for up to 64 remote clients via a single wide-area Synchronous Data Link Control line. Installed in a RAS machine, the card supports 64 clients via an X.25 link.

WAN Services for NT software runs on Eicon's EiconCard communications adapter, available for PC, AT and Micro Channel Architecture buses. Equipped with a CPU and 1M-byte memory, the card handles protocol processing, freeing the host PC to perform other tasks. To support more than one WAN link, users can install multiple EiconCards.

The vendor said the next release of the software will include a Simple Network Management Protocol agent — compatible with the Windows NT SNMP agent — that will enable a central SNMP net management system to manage WAN Services for NT.

WAN Services for Windows NT costs $595 and will be available in December.

Eicon also unveiled its Asynchronous SNA Access Node (A/SAN), a gateway that provides concurrent access to IBM 3270 and 5250 hosts via public or private X.25 packet-switched networks at speeds of up to 14.4K bit/sec.

Most other asynchronous SNA gateways only offer 3270 host access.

The gateway supports as many as 32 remote users simultaneously and works with Eicon's Windows-based terminal emulation products. A/SAN — which incorporates the functions and features of Eicon's PC-based SNA LAN Gateway — can also link to IBM hosts via SDLC, token-ring or Ethernet nets.

The A/SAN Gateway is available now and costs $6,995.

✆Eicon's U.S. headquarters: (214) 239-3270.

Wellfleet

Continued from page 15

used for packet buffering to minimize traffic overflow and net delays. It supports the same protocols and WAN interfaces as Wellfleet's existing line of Access Feeder Node, Link Node and Concentrator Node routers. The device can be managed from any SNMP net management system.

Wellfleet also announced last week that all of its remote access routers can now support optional flash erasable programmable read-only memory, enabling users to download software reconfigurations and upgrades from a central site.

The flash EPROM provides nonvolatile local storage of two software program images or configuration files. That lets a user at a central site download a new software image or configuration file to a remote router via the Trivial File Transfer Protocol, while the router retains a copy of the original.

The dual token-ring and dual synchronous WAN connection AFN is available in two configurations: the diskette-based Model 1521 for $8,495, and the flash EPROM-based Model 1530 for $9,995.

Accessing an internet backbone

Wellfleet's lineup of low-end routers

Access Feeder Node (AFN), Ethernet model supports:
- 1 Ethernet port
- 2 synchronous ports up to T-1 speeds

AFN, token-ring model supports:
- 1 token-ring port
- 2 synchronous ports up to T-1 speeds

AFN, dual token-ring model supports:
- 2 token-ring ports
- 2 synchronous ports up to T-1 speeds

All support flash erasable programmable read-only memory for remote site deployment.

SOURCE: WELLFLEET COMMUNICATIONS, INC., BILLERICA, MASS.
GRAPHIC BY TERRI MITCHELL

The AFN with a single Ethernet and two synchronous connections costs $5,995, while the AFN with a single token-ring and two synchronous connections costs $6,995. All AFN products are available now.

Wellfleet also announced last week that its routers will support IBM's Data Link Switching (DLSw) technology in its Version 7.60 software release by the end of the year. DLSw is the proposed standard for routing Systems Network Architecture and Network Basic I/O System traffic over TCP/IP backbones.

In addition, Version 7.60 will support other SNA enhancements announced separately earlier this year, including Source Route Bridge Explorer Broadcast Reduction, Network Basic I/O System Directed Broadcasts and Translation Bridging capabilities, as well as an IBM LAN Network Manager Agent.

The SNA internetworking enhancements will be available as a free software upgrade.

Citicorp

Continued from page 15

System/2 workstations and RISC System/6000 servers. It collects alarms and events from element managers, initiates automated responses to those events from user-defined script files, and shares management information with IBM's NetView.

Citicorp will use the MAXM systems to filter through alarms and events, and, through the system's scripting capability, route the most significant events to the appropriate network technician.

Management information will be kept in a common database to be shared and updated by the MAXM systems, so if one MAXM fails, another can back it up, said Jay Hoffman, vice president and director of netapplications for Citicorp International Communications.

Citicorp is also looking to standardize on a single trouble-ticketing system and consolidate its help desk operations. This will ensure that all CGIN staffers are familiar with the network's equipment and can capably operate and manage it should the need arise.

The intent is to facilitate as proactive a management operation as possible.

"In reality, we don't want to do fault management," Hoffman said. "Why? Because you've got a problem and you're fixing it. We want not to have problems."

APPN

Continued from page 15

party products by the end of 1994," said Alan Bartky, manager of technology for third-party software maker Sync Research, Inc. He is also the newly elected editor of the DLSw special interest group.

DLSw is IBM's technology for routing SNA and Network Basic I/O System traffic over TCP/IP backbones.

IBM said it will be working to implement the HPR specification into the existing DLSw technology.

"It is possible to indicate which transport to use under Data Link Switching," said Marsha Peters, lead APPN architect for IBM. "The HPR specification will be portable across multiple transports."

IBM's dependent LU Request (dLUR) technology also received a boost at this meeting. The dLUR special interest group settled on additional features, such as defining how data will flow between APPN Network Nodes supporting dLUR. IBM and third-party players will deploy dLUR software in SNA nets to let traditional 3270 terminals fully participate in APPN nets.

"We expect dLUR will reach final approval at the next meeting, and vendors can then begin implementing it," Peters said.

IBM also said work was progressing on conformance tests for third party-developed APPN products. In order for APPN to proliferate, it is crucial for third parties to build APPN products that will interoperate with one another. Today, there is no way to test APPN implementations, although IBM has said it will provide APPN testing by mid-1994.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

by Ed Krol

A new era of government access

In June, President Clinton announced new ways to communicate with the federal government, including E-mail addresses for himself and the vice president. This was big news and the end of most media reporting of the event. The other part of the statement, on-line access to a variety of federal documents,was largely ignored but is probably more useful to the on-line American.

E-mail to elected officials is an interesting twist that has many government staffers worried not about its use, but rather its ease of abuse. How does one distinguish between messages from people who are finally so enraged that they summon up all of their courage to E-mail the president and the systems administrator, who summons up all of the machine power at his disposal to E-mail the president once a second with a slightly permuted message and return address?

Building filters to sift through incoming E-mail is not easy. You could spend a lot of time building various artificially intelligent solutions that separate the wheat from the chaff for all kinds of events, and just when you have it perfect, something unexpected happens and causes the filters to be obsolete.

I can envision a great science fiction story, where the president calls an emergency cabinet meeting and there at the table in the Oval Office are the secretary of state and the secretary of systems administration.

"We've got this controversial secret peace treaty between the PLO and Israel about to be signed," the president says. "Expect hate mail from right-wing Arabs and Jews. Can I count on you to take care of the filters?"

Once it comes in, E-mail sent to the White House is printed and handled in the same traditional fashion as paper mail, which detracts from its usefulness.

On the other hand, making text available is easy. On Sept. 22, while Clinton was ad-libbing his health care reform speech to the nation, the complete text of Hillary's report was transmitted to the Extension Service of the USDA. There, in virtually real time, it was put up on their gopher server for the world to see.

Think a bit about how this changes things. It used to be that if some big announcement were made, some copies of the report would be prepared for Congress, the news media and a couple copies for public access. If you happened to be in Washington, D.C., were interested and knew where to go, you could mosey in and read the 280-page report on-site after its release.

The average fanatic would have to find a rather large library close to home that subscribed to the Federal Register and would have access to it in a couple of weeks. Typical people would never see it; their only information about what was said would come from newspaper accounts of the report highlights, predigested by some reporter whose interests may have nothing to do with the reader's.

Of course, what we are really doing here is cutting down the feedback loop to elected officials. The telephone tree, a long-standing tool of activist groups, will fall to the new tool called a mailing list.

Organizers will read the report on-line as soon as it's available, send an action request to some political action list with the infamous "insert your name here and mail to the president" letter. People will cut, paste and insert their name, and E-mail it to the president. It will arrive there in a few hours rather than a week, and we are back dealing with computer filtering and tabulation of E-mail messages.

By the way, let me tell you how the sci-fi story ends. A hacker/reporter sets the computer to send E-mail messages concerning a variety of topics to the president and watches the machine-generated replies. When the replies to the Mideast messages change slightly, the reporter knows where to look, uncovers the story, scoops everyone and leaves the White House looking for another "leak."

Krol is author of *The Whole Internet* (O'Reilly & Associates, Sebastopol, Calif., 1992) and assistant director for LAN deployment at the University of Illinois at Urbana-Champaign. He can be reached at e-krol@uiuc.edu.

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NETWORLD ROUNDUP

Optical Data Systems, Inc. (ODS) last week at NetWorld 93 Dallas unveiled a new line of work group hubs that support fiber-based Ethernet local-area networks at distances up to 2,000 meters. The Infinity 1100-FL10 and 100-FL20 support the 10Base-FL standard and provide 10 and 20 ports, respectively. Each model also offers an optional port that can be configured as an attachment unit interface or an additional 10Base-FL connection.

Management options include support for the Simple Network Management Protocol and nine groups of the Ethernet Remote Monitoring Management Information Base. Pricing for the hubs, which are available now, starts at $3,600.

ODS: (214) 234-6400.

Banyan Systems, Inc. last week announced that it will develop local-area network adapter card software drivers for all existing and future IBM Token-Ring and Ethernet adapters so those products can be used in VINES networks. IBM's LANStreamer and EtherStreamer cards will be among the first supported by Banyan.

Banyan: (508) 898-1000.

Eagle Technology, Inc. last week at the NetWorld trade show in Dallas introduced the NW2000, a wide-area network adapter card designed to connect Novell, Inc. NetWare networks running Novell's NetWare MultiProtocol Router (MPR) software.

The two-port adapter, which supports both synchronous and asynchronous communications, supports a variety of interfaces, including V.35, RS-232, RS-442, RS-440 and X.21, at speeds of up to 2.048M bit/sec. The NW2000 will ship with support for MPR Version 2.11 and frame relay. Support for the Point-to-Point Protocol and X.25 will be added in the future. Available by year end, the NW2000 costs $599.

Eagle: (408) 441-7453.

In an effort to show users it's not just a Token-Ring company, **IBM** last week announced that users can buy three IBM Ethernet adapters and get the fourth one free during a promotion that runs from now until February and applies to the company's entire Ethernet adapter line.

IBM: (800) 426-2468.

LANQuest Labs last week released a test report that IBM LAN Server Advanced Version 3.0 outperformed Microsoft's Windows NT Advanced Server (NTAS) Version 3.1 and LAN Manager Version 2.2 using nine DOS and Windows applications. The tests were run using two 16M bit/sec token-ring segments on a 32M-byte IBM Personal System/2 Model 95 486DX/50 file server.

LANQuest found LAN Server Advanced was 45% faster than NTAS and 8% faster than LAN Manager in a 100-node net. Overall, LANQuest concluded that LAN Server Advanced supported up to four times the number of users and 2.4 times the peak throughput of NTAS.

LANQuest: (408) 894-1000.

Novell delivers first pieces of its NDMS strategy plan

Products include software version of net analysis tool.

BY CARYN GILLOOLY

Dallas

Novell, Inc. last week delivered the first products in its NetWare Distributed Management Services (NDMS) strategy, which will ultimately address all aspects of managing enterprisewide NetWare environments.

NDMS is a plan under which Novell will link different management products to a single distributed database, allowing the components to share information. Net administrators will be able to access the database through Novell's NetWare Management System (NMS) console or another vendor's management platform, such as IBM's NetView or Hewlett-Packard Co.'s OpenView.

Four products were announced here at NetWorld 93 Dallas under NDMS: Version 2.0 of Novell's NMS, NetWare LANalyzer Agent 1.0, NetWare Navigator 3.0 and NetWare Licensing System software developers' kit.

As expected, the cornerstone of NDMS is the newest version of NMS, which includes built-in Internetwork Protocol and Internet Protocol Exchange (IPX) mapping, router management and network analysis (*NW*, Oct. 4, page 1).

But much of the information fed to NMS will come from the other products. For example, the new NetWare LANalyzer Agent is a NetWare Loadable Module (NLM) version of the firm's LANalyzer hardware product. Both versions provide packet capture, performance analysis and problem diagnosis about traffic traveling across the wire.

The advantage of the software version is that network administrators will no longer have to travel with the LANalyzer hardware from segment to segment of the network if there is a problem. Instead, with the NLMs distributed throughout the network, the administrator can sit at a central NDMS console and gather information from LANalyzer agents and perform network diagnostics.

Network Navigator is Novell's software distribution product. It is a set of NLMs that help administrators automatically distribute and install software, product updates, and desktop and net operating systems.

New in Version 3.0 are scheduling capa-

See Novell, *page 20*

NetWorld 93 Dallas product roundup

Company	Product	Function	Price	Availability
Preferred Systems, Inc.	DS Standard	NetWare 4.0 migration tool	Not available	Early 1994
Optus Software, Inc.	FACSys 3.4	Fax server software	$995 per server or $2,995 for multiple-server license	Now
Emeritus Technologies	TapeWare/LAN-NLM 4.2	Archival software	$299 for 5-user version $499 for 10-user version $699 for 25-user version $999 for 50-user version $1,299 for up to 1,000 users	Now
SANYO/Icon	LANser MMS Multimedia SuperServer	High-powered server	Starts at $40,000	Now
LANovation, Inc.	LAN Escort 3.0	NetWare administration software	$995 for up to 50 users $1,595 for up to 250 users	Now

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: *NETWORK WORLD*

NetWorld show hosts new vendor LAN wares

BY CARYN GILLOOLY

Dallas

A host of vendors used NetWorld 93 Dallas here last week to roll out new local-area network wares, products that ranged from superservers to network management sofware.

Topping the list was DS Standard, a product developed by Novell, Inc. and Preferred Systems, Inc. (PSI) that helps users upgrade to NetWare 4.X.

DS Standard lets NetWare 2.X and 3.X customers consolidate bindery databases maintained on individual servers and reformat the information into a unified NetWare Directory Services (NDS) format.

Jack Surfass, president of PSI in West Haven, Conn., estimated that DS Standard will reduce the time required to migrate from 3.X to 4.X by up to 90%.

"This product will save as much as 80% in administration time for network managers trying to fulfill the existing demands of the network while migrating to NetWare 4.0."

DS Standard will be available early next year, although pricing has not yet been determined.

Also for NetWare users, Somerset, N.J.-based Optus Software, Inc. released a new version of FACSys facsimile server software and Emeritus Technologies brought out TapeWare/LAN-NLM 4.2 archival software.

FACSys lets NetWare users send and receive faxes from their desktops, and the new version, FACSys 3.4, includes enhanced Message Handling Service (MHS) capabilities. This gives users more complete information about the faxes they send and receive.

Like the previous version, FACSys delivers messages directly to a user's MHS mailbox. The new version will also let users customize their incoming and outgoing faxes to include descriptions such as time and date, destination name and number, number of pages transmitted and number of retries.

In addition, FACSys 3.4 now includes Dynamic Data Exchange support, letting Windows users more easily create automated broadcast and event-driven fax operations, as well as added

See NetWorld, *page 21*

Artisoft to offer peer net management

BY CHRISTINE BURNS

Dallas

Artisoft, Inc. and VisiSoft, Inc. last week announced that they will jointly develop a management software package for LANtastic peer networks.

The collaboration, announced at NetWorld 93 here, will bring the network management capabilities of VisiSoft's flagship product, Visinet, to Artisoft's LANtastic environment, giving users tools such as real-time network monitoring, inventory mangement and historical reporting of network activity.

The new product will support management capabilities that are more critical to day-to-day operations.

Joseph Waldego, director of marketing at Artisoft, said LANtastic currently offers administrative tools that help users connect devices to a net, establish new users and set access rights. The new product will support managment capabilites that are more critical to the day-to-day operation of the network.

"The lack of this type of management has always forced peer networks to remain small," Waldego said. "These new functions will make it easier for users to have larger peer networks as well as integrate them into broad client/server systems."

Under the partnership, the companies are customizing Visinet for the peer environment. While the product has not yet been named, Waldego said it would bear the Artisoft brand when it ships at the end of the year.

The Windows-based product will support inventory management and real-time monitoring, notifying administrators of alarms via electronic mail, a pager or facsmile machine. A report capability will enable

See Artisoft, *page 21*

PEER NETWORKING

Microsoft releases details of Windows for Workgroups 3.11

BY CHRISTINE BURNS

Dallas

Microsoft Corp. officials last week detailed the company's latest version of its Windows-based peer-to-peer networking product, which promises increased speed, better LAN connectivity and enhanced client functionality.

As expected, Windows for Workgroups 3.11 will have a built- in facsimile capability, better links to Novell, Inc. NetWare nets, and centralized administration and security features (*NW*, Oct. 4, page 3).

Microsoft, in its announcement at NetWorld 93, said the new version will provide better performance due to the addition of 32-bit Network Driver Interface Specification (NDIS) drivers as well as built-in remote access services that let a remote, stand-alone Windows for Workgroup client tie into Windows NT and Windows NT Advanced Server networks.

"This is definitively the best version of Windows we have to run on a network," said Jonathan Roberts, group product manager of Microsoft's Personal Systems Group.

Roberts said some of the features of Windows for Workgroups 3.11, namely the incorporation of the 32-bit NDIS drivers for increased performance, were not scheduled for release until Chicago, the next version of the Windows desktop operating system, which is scheduled to ship next year.

NEW FEATURES

In addition to increased performance, Windows for Workgroups 3.11 lets users remotely access Windows NT and NT Advanced Server nets via the Remote Access Services built into the new product. By dialing into a Windows NT Advanced server, a remote user can access resources available on that net as well as resources on other computers running Windows for Workgroups 3.11, Windows NT and Microsoft's Workgroup add-on for MS-DOS.

Microsoft has also increased Windows for Workgroups connectivity with NetWare networks. The new version supports Novell's Open Data Link Interface card, Internetwork Packet Exchange (IPX) drivers and a 32-bit IPX/Sequenced Packet Exchange (SPX)-compatible transport. This combination lets Windows for Workgroups clients share via an IPX backbone peer resources, which are the basis of all NetWare networks.

Fax services come to Windows for Workgroups users via built-in Microsoft at Work fax software. This lets users send and receive messages and fax files that can be edited from one peer-based machine to another.

Windows for Workgroups 3.11 has an introductory price of $219.95. An add-on product for users running Windows for Workgroups 3.1 or Windows 3.1 costs $69.95. Both will be available next month.

While Microsoft was touting the praises of Windows for Workgroups 3.11, the reception by the industry was cool. David Horowitz, president of the New York-based systems integration company Landmark Data Systems, Inc., said that while Microsoft was offering interesting features in the new release, it was sending mixed messages concerning which of its products are best used in a peer environment.

"They're offering contrasting views by saying that both NT and Windows for Workgroups offer the best way to go if you're going to allow peer networking in your enterprise system," Horowitz said.

"While they are offering some pretty neat features on top of Windows for Workgroups, I think they are trying to produce a peer networking product without really understanding what peer networking is, and that's a problem for everyone involved," he added.

✆Microsoft: (206) 882-8080.

Novell

Continued from page 19

bilities that let the administrator set the system to automatically distribute software at night, for example, so it does not interfere with regular net operations. The administrator can also use this capability to schedule regular virus scans for one or all workstations.

Version 3.0 also now includes audit trailing, which can tell administrators which installs were successful and which were not and why. In addition, new security features will automatically lock a user's keyboard, letting administrators more easily control who uses the distribution capabilities.

For third-party developers, Novell brought out the NetWare Licensing System (LS). NetWare LS is a Novell-provided licensing service based on a combination of the iFOR/LS licensing system developed by Gradient Technologies, Inc. and the NetLS technology originally developed by the Apollo Division of HP.

The service will let customers track application usage as well as provide a means by which to manage software license compliance server-by-server and throughout the enterprise. The developers' kit will let developers build hooks into their applications that can then be monitored by NetWare LS.

"All these pieces are shipping today, but during the next three to 12 months, NDMS will integrate these pieces," said Barbara Goldworm, product-line manager for Novell's NetWare Systems Group in Boulder, Colo.

NMS 2.0 costs $2,495; NetWare LANalyzer Agent costs $1,495 for a single-interface version and $2,495 for the multiple interface version; NetWare Navigator ranges from $995 for a 25-user version to $30,000 for a 2,000-user version; pricing was unavailable for the NetWare LS. All products are available now.

Artisoft

Continued from page 19

users to store network activity statistics and generate reports as needed. Administrators can tap into the system from any node on the net.

Ken Davis, vice president of marketing at VisiSoft, said the new LANtastic product will interoperate with other Visinet management software, meaning LANtastic networks can be managed from other Visinet-controlled networks.

While peer networking has emerged as an easy, inexpensive way for small offices of big businesses to share computer resources, users have complained that there are not enough tools available to control the nets, especially remotely. The new software will be a welcome addition.

Even small shops appreciate the promise. Tim Best, a principal at Best Associates, a corporate head-hunting firm in Arlington, Texas, manages his 10-node LANtastic network by either running from computer to computer using a hands-on approach or taking advantage of administration tools offered by applications runnig on the network.

"But as we keep getting bigger, both ways are becoming less effective," he said.

In addition to the network management announcements, Artisoft released products that provide fault-tolerant features for LANtastic networks and add better support for Apple Computer, Inc. Macintosh machines.

Artisoft partnered with Mountain Network Solutions, Inc. of Scotts Valley, Calif., to develop backup and recovery systems. The new ArtiSave Backup series software lets DOS and Windows users back up and restore files from anywhere on the network.

The software lets users conduct either automatic, systemwide backup or selective file-by-file backup. Other features include automatic installation, easy-to-use menus, on-line help screens and simultaneous backup of files while users are on the net. The products will be available next month and prices start at $399.

The new LANtastic for Macintosh Windows gateway software allows a nondedicated personal computer to act as a gateway, providing interconnectivity between AppleShare and LANtastic networks. This product will be available later this fall for $649.

✆Artisoft: (602) 670-7100.

NetWorld

Continued from page 19

security, letting only the cover page of a fax be viewed by users with routing status.

Emeritus' TapeWare/LAN-NLM is a backup and archiving NetWare Loadable Module. The new version is compatible with NetWare 4.0, letting administrators back up an unlimited number of NetWare servers and workstations. With the previous version, designed for 3.X LANs, administrators were limited to server-by-server backup procedures. According to the company in Fresno, Calif., TapeWare backs up net files as well as NDS information, providing better security.

FACSys is available now for $995 per file server or $2,995 for a multiple file server license. TapeWare/LAN-NLM 4.2 is available now in five-, 10-, 25-, 50- and 1,000-user versions for $299, $499, $699, $999 and $1,299, respectively.

Addressing performance, SANYO/Icon last week brought out a family of superservers, dubbed the LANser MMS Multimedia SuperServer line.

The MMX400, the smaller of the boxes, is powered by a single Intel Corp. 486 processor and has a 64M bit/sec backplane and 256M bytes of error-correcting memory. At the high end, the MMX500 can support as many as 14 Intel Pentium microprocessors and includes a 400M bit/sec bus and over 1G byte of error-correcting memory.

Pricing for LANser MMX Multimedia SuperServers, available now, begins at $40,000.

Finally, LANovation, Inc. last week rolled out LAN Escort 3.0, administration software for NetWare LANs. The new version is designed specifically to make it easier to manage Windows-based clients on NetWare nets.

"There was an overwhelming request from customers to make administering Windows on NetWare easier," said Anne Peterson, LAN Escort product manager at LANovation in Minneapolis.

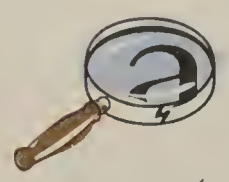
The new version simplifies the process of setting up Windows environments by letting administrators view and edit users' Windows files. In addition, when setting up the network, "profiles" representing specific Windows file settings can be assigned to a user or group of users simply by dragging and dropping. These profiles can be associated with specific applications, so if the administrator adds an application, all changes are made automatically.

LAN Escort 3.0 is available now at $995 for a maximum of 50 users and $1,595 for as many as 250 users.

✆PSI: (203) 937-3000; Optus Software: (908) 271-9568; Emeritus: (209) 292-8888; SANYO/Icon: (714) 263-3758; LANovation: (800) 747-4487.

Trapped In The Body Of This Tiny Ser

This is a story about a small computer engineered to be so dependable, you won't think twice about trusting it with your mission-critical applications. And to be this without filling a closet, much less a room. If you haven't thought of Compaq as an enterprise-critical platform before, we invite you to grab your bifocals and begin. (We'll be cramming a lot of information into this ad, which, given how much we managed to fit into our new servers, only makes sense.)



If there's one thing we've learned working with our customers, it's that you're running more and more mission-critical applications on your network. And if your network goes down, your business goes down. All of which makes the introduction of the new Compaq ProLiant Server even more timely.

The ProLiant is a new family of affordable, high-performance, easy-to-manage servers engineered specifically to provide the high availability you need for mission-critical networks. We've designed ProLiant in three different models, ranging from a single-processor configuration to a four-Pentium processor model.

Now, how can you be sure our server is truly a miracle and not a mirage? To begin with, there's Full Spectrum Fault Management, provided by Compaq Insight Manager technology and software that continually monitors over 800 aspects of the server's operating status. (For example, Drive Parameter Tracking checks 15 hard-drive parameters.) All of this information is constantly gathered, analyzed and then used to prevent, tolerate or recover from system problems.

If the performance of a monitored component drops below a specified level, our unique Pre-Failure Warranty kicks in. We'll actually replace a Compaq warranted drive or memory system free. Before it stops working. No downtime. Ringing cash registers. Happy boss.*

Still, no network's perfect. In the unlikely event problems occur, our server exhibits remarkable tolerance. Every ProLiant includes Compaq-designed hot-pluggable drives. ProLiant Models 2000 and 4000 come standard with advanced error-correcting memory and off-line backup processor features (whereby the server reboots automatically to a second processor). And, most notably, the Compaq Smart SCSI Array Controller together with the ProLiant Storage System ensures mission-critical data integrity. Should a network problem bring the server down, the Rapid Recovery Systems of the ProLiant are designed to bring it back up.

VER IS A MAINFRAME WITH AN ATTITUDE.

For example, Automatic Server Recovery 2 uses a historical record of server status and performance to perform an astonishing array of tasks. Like intelligently restarting the server, automatically correcting a variety of problems, and accessing a telephone pager to contact network administrators.

By now you'd expect us to have rethought server setup, configuration and OS installation, but you might be surprised by the results. Introducing SmartStart, a CD-ROM system that takes the headache out of getting your server up and running. ProLiant includes a CD-ROM drive and bundled CDs of optimized Netware and other major operating systems. To get hooked up to your network operating system, simply call your dealer for an access code, enter it, answer a few questions, and leave. Minutes later—say, after you've enjoyed a cup of coffee and a jelly donut—you'll return to find an integrated OS fully installed and optimized for increased performance and improved management. And we'll keep you updated via CD when new operating system versions appear.

*And finally, to accompany our new line of mission-critical servers, we're introducing mission-critical support. With ProLiant, we now offer extensive analysis, installation and service through our CompaqCare System Partners, a select group of highly trained systems experts backed by Compaq engineers. You can now choose 4-hour on-site warranty response upgrade** direct from Compaq. Again, there's our unique Pre-Failure Warranty. And, of course, all Compaq servers come with a 3-year on-site† warranty, and 7-day-a-week, 24-hour-a-day technical support.*

All in a surprisingly small box for not a whole lot of money. In fact, a DX2/66 Compaq ProLiant 1000 starts at about $6000‡.

Which may help to explain the look your boss gives you when he hears how much money you've saved: stunned admiration. But you'll get used to that. It goes with the territory. For more information on the new Compaq ProLiant servers, or for the location of an authorized Compaq reseller near you, just call us at 1-800-345-1518. If you'd like to receive model, feature and specification information immediately via fax, select the PaqFax option. Or, if you'd like that information even sooner, just turn the page.

COMPAQ

The New Compaq ProLiant Mission-Critical Servers

	ProLiant 1000	ProLiant 2000	ProLiant 4000
High Performance Network Servers			
Processor	DX2/66 or Pentium 60MHz	DX2/66 or Pentium 66MHz	DX2/66 or Pentium 66MHz
Architecture	TriFlex/PC One Processor	TriFlex with up to two symmetric processors	TriFlex with up to four symmetric processors
Network Interface	Up to 12 High-Speed Channels; NetFlex 2 with Packet Blaster Technology Standard		
Standard Disk Controller	Integrated Fast SCSI-2 and Smart SCSI Array Controller (selected models)		
Storage Capacity	550MB–112GB Internal/external	1050MB–140GB Internal/external	1050MB–140GB Internal/external
Typical Usage	Departmental network services—primarily NetWare	Departmental network application services—NetWare, NT and Unix	Application services for preemptive downsizing—NT and Unix
Transaction Rating	50–150 TPS	200–300 TPS	300–400 TPS
Estimated Starting Street Price‡	$6,000	$8,900	$13,900
Server Dependability and Availability			
Management	Second-generation Compaq Insight Manager (standard) combines with innovative hardware design to constantly monitor, assess and report server health and performance		
Fault Prevention	Insight Manager alerts you to server status changes in over 800 component parameters, allowing proactive server management backed by 3-Year Pre-Failure Warranty		
Fault Tolerance	Standard support for RAID levels 1,4,5; hot-pluggable drives; on-line spare drive; off-line backup processor§; advanced ECC RAM§		
Fault Recovery	Standard rapid recovery services automatically return server to full operational status even in the event of a critical subsystem failure		
Simplicity, Ease of Ownership and Support			
SmartStart	Standard CD-based intelligent hardware configuration and system software installation, providing simplified server configuration for NetWare, NT or Unix. (CD-ROM drive standard)		
System Warranty	Free Three-Year, On-Site Limited Warranty		
Pre-Failure Warranty	Three-Year, On-Site Warranty replacement of designated components that fall below preestablished thresholds		
4-Hour Warranty Response Upgrade	Optional Three-Year On-Site Warranty upgrade to 4-hour response		
Technical Support	Toll-free, 7 x 24 technical phone support from Compaq engineers		
CompaqCare System Partners	Highly trained, dedicated, third-party professionals who provide systems maintenance and comprehensive technical support		
QuickFind/PaqFax	Proactive notification and delivery of new technical information/7 x 24 fax response for updated specification, configuration and settings data		

COMPAQ

Satan Bug virus on the loose in government computers

BY ELLEN MESSMER

Washinton, D.C.

Vendors of antivirus software are scrambling to update their products to cope with the Satan Bug, an encrypted, polymorphic virus that is attacking government computer systems.

The subject of a recent alert from the Department of Energy's (DOE) virus watch group, called Computer Incident Advisory Capability (CIAC), Satan Bug is described as particularly difficult to battle because it is encrypted. Satan Bug can render files inoperable, change file dates and shut users out of local-area networks by damaging LAN interface drivers.

Satan Bug virus

Attacks
DOS computers

Virus type
Memory-resident, polymorphic and encrypted

Damages
.COM. .EXE, .SYS and .OVE files. Makes LANs inaccessible by damaging LAN drivers.

Symptoms
Files grow, file dates change, and files on LAN servers become inaccessible.

SOURCE: COMPUTER INCIDENT ADVISORY CAPABILITY, WASHINGTON, D.C.
GRAPHIC BY SUSAN J. CHAMPENY

The CIAC advisory said Satan Bug has been located at multiple sites, and sources at the DOE said several divisions are trying to battle it with virus detection software.

CIAC, one of the agency members of the governmentwide Forum of Incident Response and Security Teams, issues advisory bulletins when significant virus problems are reported to the DOE.

The CIAC bulletin noted that encrypted viruses like the Satan Bug are particularly difficult to remove from an infected program. Encrypted viruses attach themselves to a computer program, capture a small piece of the program and replace it with virus code. The virus then encrypts itself along with the captured piece of program.

"For an antivirus program to be able to patch an infected program, it must be able to decrypt the encrypted virus to find the piece of missing code so that it can be put back where it belongs," the bulletin stated. "The Satan Bug has up to nine levels of encryption, the level being different for each infection."

The encryption will also make the virus invisible to antivirus scanners dated before August. "Virus scanners must open a file to scan it, and if your virus is in memory, the act of opening the file for scanning will infect it," the bulletin warned. "If you run an infected antivirus scanner, nearly every executable file on your disk will be infected."

Satan Bug was identified in February when it was found posted on several bulletin boards by an individual known as Hacker4Life, said David Stang, president of Norman Data Defense Systems, Inc., a software firm in Fall Church, Va.

Stang said that based on its sophistication and his work with viruses, Satan Bug is probably the work of a 20-year-old American male, not something created by a mischievous 14-year-old.

Norman Data Defense Systems has prepared virus defense software that enables the virus to be removed while leaving files intact. Stang claimed this software, called Armour, also prevents infection.

Roger Thompson, president of Marietta, Ga.-based Leprechan Software, Inc., said his staff spent one weekend updating its virus protection software to handle Satan Bug after a government agency called them.

"Satan Bug is a complicated virus, and it's hard to detect," he said. "It has an encryption/decryption loop, and it decrypts itself using a key anywhere between 40 and 2,000 bits long.

The newest trend in the virus community is making them hard to see."

Another vendor, McAfee Associates, also said it has software to combat Satan Bug.

Satan Bug is polymorphic, or coded to be infinitely variable and constantly changing.

For help in coping with viruses or preventing them, the computer systems security division of the National Institute of Standards and Technology offers a document, "A Guide to the Selection of Anti-Virus Tools and Techniques." It is available in electronic form online by dialing (301) 948-5717.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

NETWORK MANAGEMENT

by Mark Gibbs

Hypertension and applications

This has been the month that software almost drove me over the edge. My blood pressure has reached new heights, and I've taken to grinding my teeth at night. And it's only the first week of the month.

Why the stress? I tried to install several supposedly network-compatible software products. If wild distortion of the truth about software functionality and manageability were a crime, many application vendors would be in the big house making license plates.

Let's start with installation. Why haven't vendors figured out that we don't want manuals? If I get a manual that vies with *War and Peace* on a weight-for-weight basis, it better be some kind of mongo-hot product.

If I have to wade through acres of deathless prose that have a more narcotic than informative effect, I'd better get something that's worth it at the end of the exercise. For example, if it changes my life and gets me a Nobel Peace Prize, then I'll go with the flow.

Even then, I resent having to read a manual just to get the product running. I want to open the box, take out the disks, stick the one labeled (clearly, please) Disk 1 in the first drive I choose (not the one I'm told to use) and type SETUP (or whatever).

If I don't have enough disk space, the product should tell me. If I have to abandon the setup process, it should remove all of the stuff installed up to that point.

If a product fails during installation, it should detect that fact when the setup system is rerun — don't make me do the whole process over again. And for mercy's sake, give me an uninstall option. There is nothing more aggravating and time-consuming than having to second-guess some nerd's idea of system integration when you need to remove an application.

As the product installs, it should tell me what it's doing and how long it's going to take. It should get user IDs from the network, find the printers and detect servers; it shouldn't mess with anything without asking first. Then, if authorized, the setup program should make backup copies of anything to be changed so that recovery is possible.

And as the setup proceeds, the setup program should show me that it is alive.

When I get the product running, still don't expect me to read the manual. It's not like the old days when software had to be shoehorned into 64K bytes of RAM and a 20M-byte hard disk, and you had to rely on paper documents.

You've now got megabytes of RAM, processor speed galore (well, a lot of it, anyway), reasonable displays and tons of disk space. Give me tutorials, on-line help and context-sensitive advice. When you do give me tutorials, make them short, modular, topical and useful. And do not attempt to keep selling me on the damn product.

Give me intelligent setups and smart configuration. Give me applications that learn my preferences by either asking me or watching how I do things.

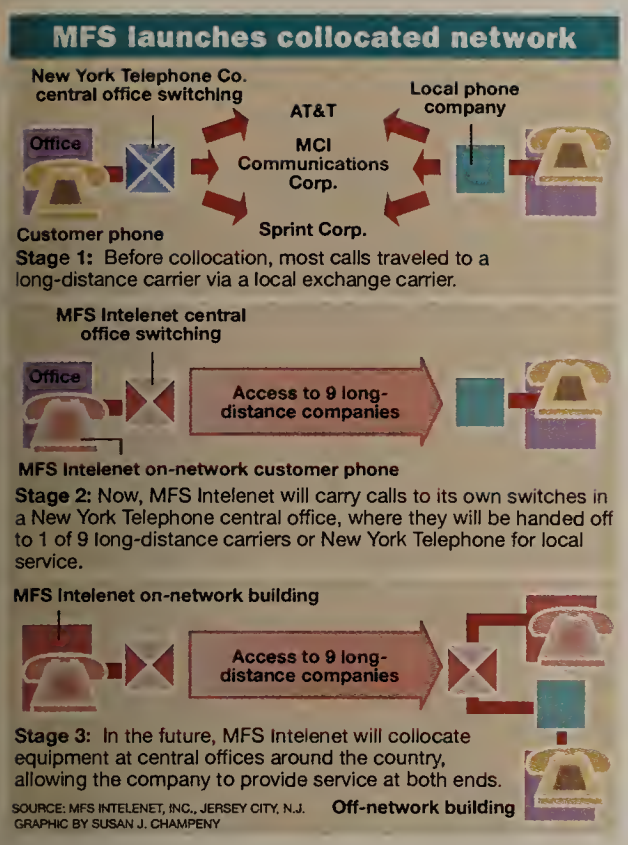
When a product doesn't work (an all-too-frequent occurrence in the network environment), give me a toll-free number (Why should I pay to debug your product?) and tell me up front what your support turnaround time is. If I cry "emergency," respond.

When I tell you my problem, don't try to pass the buck to another vendor without a really good reason. If my system worked fine before installing your product and doesn't work now, bite the bullet and help me.

What we need is a set of standards for network applications. These should define the critical factors required to be acceptable. If the readers of this column have suggestions and recommendations, please let me know. We'll compile the input and publish the list in a future issue.

Perhaps my blood pressure will drop by then.

Gibbs is a consultant and writer based in Ventura, Calif. If you'd like to contact him, E-mail on CompuServe at 75600,1002 or on the Internet at mgibbs@rain.org.



MFS offers local, long-distance service package

BY BILL BURCH

Jersey City, N.J.

MFS Communications Co., Inc. last week launched a local and long-distance service package for small and midsize businesses in New York City, and announced plans to provide it in as many as 70 cities within the next five years.

"We're providing an integrated package of services that ... customers haven't been able to get since divestiture," said Kirby Pickle, president of newly formed MFS Intelenet, Inc., the MFS subsidiary that provides the service.

The new package includes flat-rate long-distance and no-toll local calling for small to midsize businesses with 5 to 200 phones.

In New York, MFS Intelenet switches collocated in New York Telephone Co. central offices provide links to nine long-distance carriers and to locations served by New York Telephone. As MFS Intelenet collocates in other cities, the carrier will be able to widen service coverage (see graphic, this page).

For long distance to the 48 contiguous states, MFS Intelenet is charging a flat rate of 14 cents per minute, whereas flat-rate services from other carriers cost 15 to 16 cents per minute.

The company is also going with simplified pricing for the local portion of the service. The entire New York metropolitan area is treated as a single calling area, eliminating local toll charges, and MFS Intelenet plans to stick with the same no-toll approach for its launches in other cities. Local per-line charges will be as much as 41% cheaper than New York Telephone's and usage charges will fall around 9%, Pickle said.

So far, MFS Intelenet has signed up about 70 customers for the service and has around 35 customers on the network. After New York, the carrier plans a rapid service launch in the 14 cities currently equipped with MFS fiber rings. Within three to five years, MFS Intelenet plans to have service in 60 to 70 cities.

See **MFS**, *page 28*

Beta user gives AT&T thumbs-up for SDN tool

BY BOB WALLACE

San Antonio, Texas

United Services Automobile Association (USAA) last week said a new AT&T tool it has been beta-testing is helping to simplify the management and administration of its nationwide Software-Defined Network.

AT&T's Network Administration System (NAS) is personal computer software that lets users download SDN data from AT&T, build reports and collect inventory information.

"NAS is user-friendly and helps SDN users get a handle on their networks," said Donn Greiner, a telecommunications analyst with USAA's Information Services Division here. "It helps me manage change. I'd recommend it to every SDN user."

AT&T has well over 2,000 SDN users, according to a spokesman for the carrier.

USAA's SDN comprises 22 locations that use dedicated T-1 or T-3 access, 1,320 sites that use switched access and more than 1,000 that use cellular access.

For years, the company relied on countless file folders and voluminous stacks of paper to manage its SDN.

So when AT&T developed an on-site SDN management tool called Service Management System (SMS), which lets users access SDN data on-line but not download it, Greiner tried it, but he didn't buy it.

"With SMS, we had to stay on-line constantly and scroll down from screen to screen for each site," Greiner said. "With a large SDN, that process takes forever."

NAS doesn't have that shortcoming. With NAS, network managers can dial into AT&T's SDN Control Center (SDNCC) in Atlanta as frequently as needed and download constantly updated network information to an on-site Intel Corp. 386 or 486 PC.

SDN managers can then use NAS to massage the data and generate a series of reports that help in spotting trends.

"We can print out a list of all active SDN locations, along with their location ID and 10-digit on-net and off-net telephone numbers," Greiner said. "It's a great way to track which sites are active and which aren't."

NAS also gives users a central repository for inventory information, such as details on private branch exchanges, trunk groups and circuit numbers, thus obviating the need to maintain this data on a separate PC.

He includes circuit numbers and net equipment such as channel service unit/data service units, with a contact number for the internal or external technician responsible for supporting the facilities.

Greiner would like AT&T to enhance NAS so that SDN users could upload this information to technicians at the SDNCC if a problem with the service or attached equipment arose. "Having that information at their fingertips would probably speed trouble resolution in some instances," Greiner said.

OUTSOURCING

Users hesitant about farming out net control

BY ELLEN MESSMER

New York

U.S. and European users remain wary of outsourcing their networks to international service providers, but firms that turned over control of their networks to outsiders said they have no regrets.

Of the 100 large U.S.-based multinational companies recently surveyed by The Yankee Group, a Boston-based consultancy, 45% said there is no way they would consider outsourcing their network operations. This compares to 34% of 100 large European-based companies The Yankee Group surveyed, which also said no to outsourcing (see graphic, page 28).

In the U.S., 28% of those surveyed are evaluating outsourcing options and 9% have already outsourced much of their global networks, said Berge Ayvazian, senior vice president of communications research and consulting at The Yankee Group's recent Global Network Strategies conference here.

"During the past year, there's been an emphasis on network outsourcing as a key effort to streamline operations," Ayvazian said. But in general, end users remain unconvinced that third parties can be relied on to provide adequate maintenance and support in a timely fashion.

Companies that have taken the plunge into outsourcing, however, are reporting good results.

J.P. Morgan & Co. Inc., BP Exploration Company, Ltd. and Bankers Trust Co. each entered into multiyear outsourcing agreements with of AT&T, Cable & Wireless Communications, Inc., Hong Kong Telecom International, Ltd. and Syncordia Corp. to run their voice, data or local-area networks worldwide.

"As of May 3, J.P. Morgan no longer operates its own wide-area networks," said Bowley Moore, vice president of global networking at J.P. Morgan.

BT Tymnet, Inc. runs J.P. Morgan's 90 X.25 nodes globally, while AT&T installed and manages the company's LAN internet in 10 countries. MCI Communications Corp. and Infonet Services Corp. support J.P. Morgan's global transport network, providing services such as seven-digit dialing and maintaining multiplexers and routers.

"What we've learned is we can can control our outsource vendors' costs a lot better than we can control our own," Moore said.

As a consequence of outsourcing, costs for commodity voice and data services were reduced 20%, Moore noted, while technical staff size shrank more

See **Outsourcing**, *page 28*

BRIEFS

The California Public Utitilities Commission may regret asking Pacific Bell and GTE California for help in its recent decision to launch local toll competition in the state. Staffers from the two local exchange carriers took part in drafting the commission's order and also lent a hand in setting new phone rates. But now the commission is concerned the staffers might have engaged in lobbying while working on the order. An investigation is under way, and the commission last week was considering whether to stay the order.

The Viriginia judge that let **Bell Atlantic** provide video programming within its territory turned down other local exchange carriers' request to widen that decision to include them. U.S. District Court Judge T.S. Ellis III ruled in August that the 1984 Cable Act barring phone companies from owning cable companies in their own territories was an unconstitutional infringement on Bell Atlantic's First Amendment right to free speech.

Given the breadth of that pronouncement, the other phone companies had hoped Ellis would overturn the cross-ownership ban nationwide, but the judge declined to apply the decision more broadly.

Alexandria, Va.-based software firm **NPRI, Inc.** has created software that links private-branch exchanges and computers at multiple sites into a "virtual PBX." Using teleTech Dial V4.2, a systems designer can create a predictive dialing network that links a number of remote sites as if they were a single call center.

Westinghouse to offer turnkey wireless packs

BY ELLEN MESSMER

Baltimore

Planning to play a role as wireless systems integrator, Westinghouse Electronic Corp. has announced that it is buying packet-data services in volume from two sources so it can offer nationwide wireless service to businesses.

Westinghouse awarded one contract to RAM Mobile Data, Inc. for its existing service and another to Bell Atlantic Mobile Systems, Inc. and GTE Mobilnet, Inc. for upcoming Cellular Digital Packet Data (CDPD) services set for rollout early next year. Westinghouse plans to package each service with equipment and software, and offer wireless communications to corporate users.

SCOTT

David Oros, Westinghouse director of wireless services, said the firm will focus on three primary markets: fleet management; information management for sales and support applications; and asset management for inventory control in warehouse operations.

The request for proposal that Westinghouse issued last May for volume packet-data service attracted six responses, with RAM Mobile Data and the Bell Atlantic Mobile Systems-GTE Mobilnet team emerging as the two winners, mainly due to their low prices.

RAM Mobile Data's packet-data service, available in 210 metropolitan areas, supports 8K bit/sec links, while the CDPD-based services will support 19.2K bit/sec.

Eight cellular carriers in the U.S. plan to overlay CDPD on top of their current switched cellular infrastructure. The CDPD services that Westinghouse has purchased from the Bell Atlantic Mobile Systems and GTE Mobilnet team — which includes Ameritech, BellSouth Corp., Nynex Corp. and US West, Inc., as subcontractors — will cover 61 of the largest metropolitan areas.

Chicago, Houston, San Francisco, Pittsburgh and the Baltimore/Washington, D.C. areas are expected to be the first CDPD service areas on-line in early 1994.

The Bell Atlantic Mobile Systems-GTE Mobilnet contract is for 4 1/2 years, while terms for RAM Mobile Data were undisclosed.

"This is really the first major CDPD contract that's been let," said Benjamin Scott, executive vice president and chief executive officer of Bell Atlantic Mobile Systems. "They know what pricing they're getting over a long period," said Jerry Waylan, GTE Mobilnet's executive vice president of marketing.

Bell Atlantic Mobile Systems will serve 11 of the 62 cities, GTE Mobilnet will serve 15, and the rest will go to various Bell company cellular carriers across the country.

Westinghouse will open a service center here to provide sales, service and billing to customers. RAM Mobile Data, GTE Mobilnet and Bell Atlantic Mobile Systems will provide technical and operational support to Westinghouse, which plans to act as as one-stop shopping source.

WAYLAN

"Westinghouse is a significant award," said Charles Nahabedian, vice president of network development at RAM Mobile Data. "They're talking about handling one billion packets per month in 1996."

Nahabedian said RAM Mobile Data signed a similar reseller contract with AT&T earlier this year. AT&T's marketing program, implemented just this month, provides wireless packet-data access to its EasyLink messaging service.

MFS

Continued from page 27

Among MFS Intelenet's new customers is Gleacher & Co., a financial advisory and consulting firm in New York. The firm's 35 employees make a total of $5,000 to $6,000 worth of local and long-distance calls per month.

Roughly 80% of those calls are long distance, and Gleacher has long sought a way to bring down costs. The firm managed to save 30% to 40% when it switched from AT&T to small long-distance resellers and saved an additional 16% to 18% by switching to MFS Intelenet two months ago, according to Drew Gilman, an associate with the firm.

"We'd spent way too much time here trying to deal with resellers and third parties to try to drive our costs down," Gilman said. "We saw [MFS Intelenet] as a way to have that decision be done automatically for us."

Gilman said his company was also drawn to MFS Intelenet as a one-stop outlet for its telecommunications needs and for the no-toll local service. Also, the firm makes a fair number of local calls to legal and accounting firms, and values MFS Intelenet's no-toll local service, he said.

"We're hoping basically to let them manage all of our needs ... 'cause we're a small place and we don't have anybody who does that on a full-time basis," Gilman said.

MCI restructures, defines key goals

BY BILL BURCH

Washington, D.C.

MCI Communications Corp. Chairman Bert Roberts Jr. has unveiled a new corporate structure aimed at helping the carrier achieve three core goals: win domestic market share, expand internationally and bring emerging technologies to market.

Coming in the wake of this summer's departure of MCI President Daniel Akerson, the changes should mean a better focused sales staff offering services closely tailored either to the domestic or international markets. Also, an emphasis on research and development promises to yield new connectivity options via such technologies as personal communications services (PCS).

DAVID HATHCOX

TAYLOR

MCI is no stranger to reorganization. At the time of AT&T's break up, MCI had been built around seven divisions. After a reorganization, the company focused on just two key areas — the consumer market and national accounts. Now, with Akerson's departure, Roberts said he has decided to restructure again so the company's staff is built around the three key areas of the domestic market, international accounts and new technologies.

On the domestic front, Roberts announced the promotion of Gerald Taylor to head MCI Communications Services, a new unit that will include the carrier's U.S. operations and core long-distance business. Reporting to Taylor will be Business Markets President Timothy Price and Consumer Markets President Angela Dunlap.

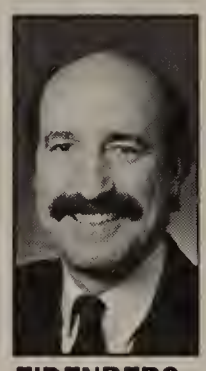
An MCI employee since 1969, Taylor helped launch Execunet in 1975, MCI's first switched long-distance service for businesses. Most recently, Taylor was president of MCI Consumer markets and was behind the company's successful "Friends & Family" consumer long-distance program.

To spearhead MCI's international growth effort, Roberts put Eugene Eidenberg in charge of the MCI International Group. Eidenberg, an 11-year veteran of the company, has been executive vice president for corporate strategy and global business initiatives.

Before joining MCI, he served in a number of government posts, including assistant for intergovernmental affairs to President Jimmy Carter. As head of international business, Eidenberg will oversee MCI International President Seth Blumenfeld and Jonathan Crane, now president of the new Multinational Accounts Group.

Internationally, the company has made a good start on expanding its global presence with its BT alliance. BT is acquiring 20% of MCI, and the two plan to set up a shared network platform to jointly offer dedicated links, virtual private networks, and advanced data and 800 services. The restructuring will position the company to focus on correspondent relationships and international alliances and accounts, Roberts said.

New technologies, such as PCS, multimedia and messaging, will be the third strategic area for MCI, Roberts said. Those research areas are under Richard Liebhaber, who will continue as chief strategy and technology officer.



EIDENBERG

With the personnel changes and corporate restructuring, MCI is looking to give its business units more autonomy. The reorganization positions MCI for tremendous growth, said analyst Jeffrey Kagan, president of Tele Choice Consulting in Marietta, Ga.

"It used to be that MCI was just a long-distance company, and now there are so many different areas that they have to get involved with," Kagan said. "You need to have individuals and departments and divisions that are set up to concentrate on those individual areas as though they were the most important thing in life."

As MCI redefines its core businesses, the carrier must also work to hang on to key national accounts. One such company is Merrill Lynch & Co., Inc., which recently renewed its service agreement with MCI, signing a new contract with an estimated value of $125 million.

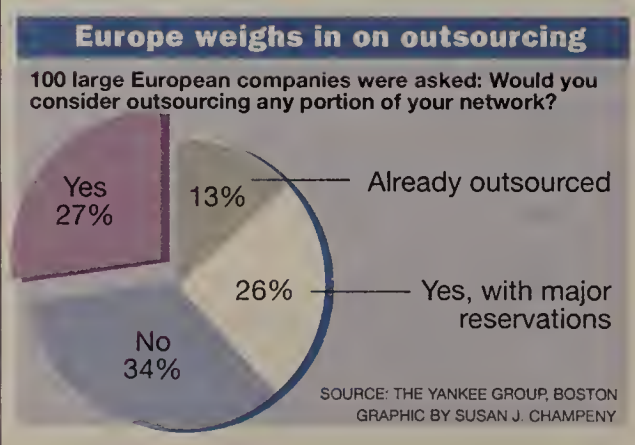
MCI will be supplying the firm with domestic and international services, including 800, digital data and virtual private network services. Merrill Lynch is also planning to try MCI's frame relay service.

Outsourcing

Continued from page 27

than 25%. Holding onto qualified people once a firm decides to outsource is difficult, he acknowledged.

BP Exploration Company, Ltd., which drills for oil in far-flung areas of the world, earlier this year outsourced both its communications and computer hard-



ware and software support in seven data centers to three companies: Syncordia; Birmingham, England-based Sema, Ltd.; and San Diego-based Science Applications International Corp. (SAIC). The contracts with the three vendors run for five years.

Outsourcing, which typically involves months of difficult negotiations, first requires the user to accept the possibility that a vendor can provide global support as well — or better — than the in-house staff.

"We thought we knew a lot about what we were doing, but we weren't nearly as good as the outsourcing vendors," said John Cross, general manager of information technology at BP Exploration about the company's experience during the past year.

Outsourcing did mean layoffs for some technical staff, however. "Our organization is down to 10% of its original size," Cross said.

At both J.P. Morgan and BP Exploration, the in-house network staff members are now asked to focus less on day-to-day engineering and more on analytical questions pertaining to how technical resources can be applied to solve their firms' business problems.

"For me, it was getting out of the engine room and getting on the deck, and then the bridge, to see where the company was going," Cross said.

At J.P. Morgan, "We had our own telephone company basically, and sometimes when you're building your infrastructure, you forget who you're building it for," Moore said.

Outsourcing has helped J.P. Morgan focus on deploying a battery of client/server applications that are shared over a globally interconnected LAN. Technical staff now works with J.P. Morgan's traders to develop financial trading software that is shared by all J.P. Morgan offices worldwide.

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by David Rohde

Calling Mexico? Check your map first

Suppose Congress ratifies the North American Free Trade Agreement (NAFTA) and your company decides to build a new facility in Mexico. Or Congress rejects NAFTA and your company invests in Mexico anyway. Can you control the cost of the new cross-border voice and data traffic by carefully choosing the carrier and service?

Only up to a point, it turns out. Here's why.

Usually, calls from the U.S. to other countries are not distance-sensitive. Obviously, it costs more to call Korea than Europe — Korea is halfway around the world. But once you've selected the carrier, service, access method and destination country, the cost generally does not vary by distance.

For example, a call from the U.S. to the U.K. using AT&T's Optimum service with a dedicated access line during peak hours costs 87.03 cents for the first 30 seconds and 8.45 cents for each additional six seconds, no matter from which city it is placed.

What does make a difference is the service and access method you select.

If you use Optimum with switched access for calls to U.K., the cost rises to almost $1.03 for the first 30 seconds plus 9.95 cents for each additional six seconds. But if you use AT&T's Megacom service, the cost drops to 80.52 cents for the initial period and 7.81 cents for each additional period.

The exceptions are calls to Canada and Mexico. With most services, calls to Canada are made under a distance-sensitive rating table, exactly as they are for most domestic U.S. services.

But calls to Mexico are distance-sensitive in a different way — there's a charge for the portion within the U.S. to the most logical border-crossing point and a charge for the portion within Mexico. The Mexican portion is priced on an eight-step rate table that stays fixed regardless of which U.S. service and access method is chosen at the origination point.

From 7 a.m. to 7 p.m., Mexican portion rates run 16 cents per minute for Rate Step 1 and rise dramatically to $1.18 per minute for Rate Step 8. The rate step used depends on the distance from the U.S. border to the destination point.

The U.S. portion varies by service and access method, but the fixed nature of the Mexican portion schedule can blunt price differences between U.S. carriers.

Consider a 10-minute call from Chicago to Mexico City. Using Sprint Corp.'s Ultra WATS, the U.S. portion costs 39.98 cents for the first 30 seconds and 2.19 cents for each additional six seconds. Using AT&T's Megacom, the U.S. portion costs more — 43.72 cents for the initial period and 2.39 cents for each additional six seconds. That's a hefty 9.2% difference for the 10-minute call.

But when you add $1.11 per minute for the Mexico City charge to both calculations, the total cost, excluding access charges, comes to $13.58 via Sprint and $13.80 via AT&T. That's a difference of only 1.6%! Incidentally, you don't have to buy all of the carriers' tariffs to compare these costs; they're all contained in the Center for Communications Management Information's (CCMI) continually updated *Guide to Networking Services* Volume 5, which covers international services.

The bigger factor will be where you are calling in Mexico. If you place your company's new facility in Monterrey, not only does the 10-minute call cost drop, but also the carrier difference starts to reemerge. Using Sprint Ultra WATS, the cost would be $6.98 as opposed to $7.20 with AT&T Megacom — a difference of 3.1%.

So if you want to make a difference, maybe you should lobby to have telecommunications analysts added to major corporations' foreign expansion committees.

Rohde is associate publisher of the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff information. He can be reached at (301) 816-8950, Ext. 292 or on CompuServe at 74140,1474.

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To those in the know, the mere mention of the name Novell strikes up images of successful networking. Their alliance with over 2,500 software, hardware and system vendors has helped them create NetWare, the operating software that allows systems as different as Microsoft, IBM, and Oracle to work together, seamlessly. In short, Novell is the industry standard in networking software. And that standard is our standard.

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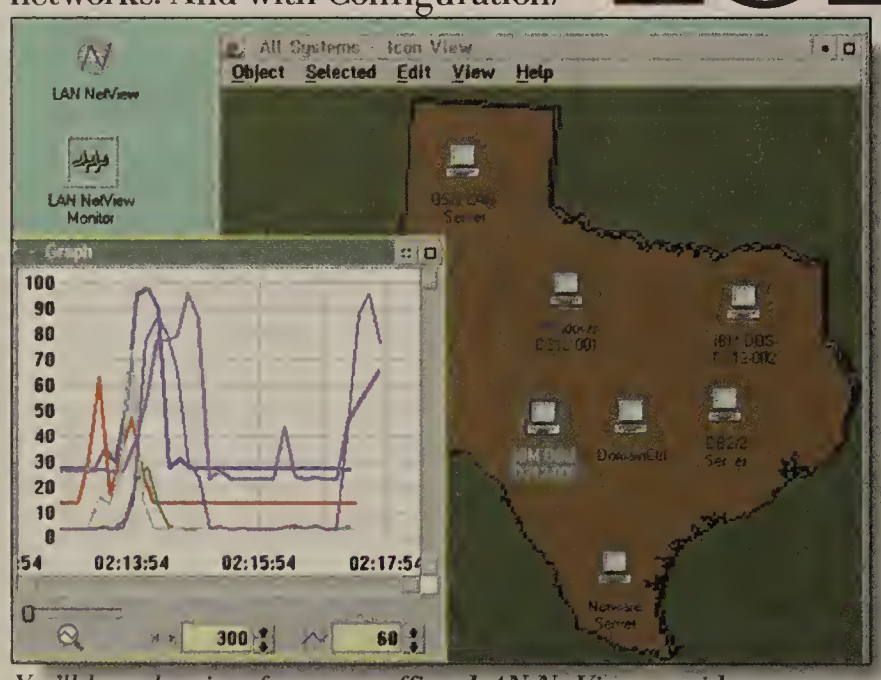

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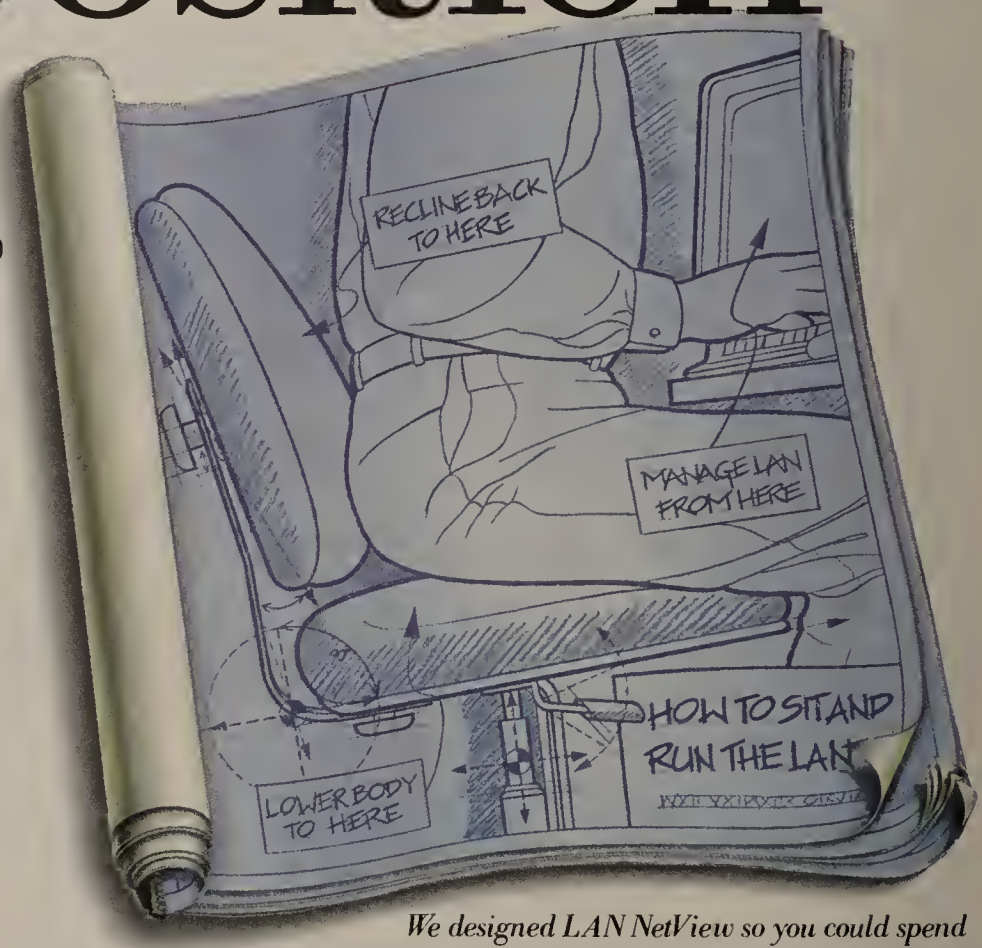

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BRIEFS

LaserData, Inc. recently announced two new products, DocuData document management software and DocuFlow work flow software. DocuData is Windows-based software that runs on Novell, Inc. networks and enables developers to build applications that handle documents with multiple data formats, including text, voice and video.

DocuFlow provides a dynamic data exchange (DDE) interface to Action Technology, Inc.'s new work flow engine (see story, this page) that decreases the number of commands a developer needs to work flow-enable a Windows applications. A 50-user license for an application built using both products costs about $2,005 per seat.

LaserData: (508) 649-4600.

Computron Technologies last week said it will port three of its client/server applications to Sun Microsystems, Inc.'s Solaris operating system. The applications are Computron financial software, EPIC work flow software and Computer Output On-line system for accessing text reports.

Computron: (800) 828-7660.

Computer Associates International, Inc. last week began shipping CA-Visual 20/20, a graphical 3-D spreadsheet for Windows that provides access to data in SQL databases running on Digital Equipment Corp. VAX machines, ASCII files and personal computer-based spreadsheets. It costs $195. A Database Connection Server costs $1,995.

Computer Associates: (516) 342-5224.

Magic Software Enterprises, Inc. last week announced a NetWare Loadable Module (NLM) version of its Magic application development tool. The Magic-NLM runs on 32-bit versions of NetWare, which more than doubles previous transactional throughput rates.

Magic: (714) 250-1718.

Motorola, Inc. and **Reuters America, Inc.** have teamed up to offer a financial news service that is broadcast hourly to users of Motorola's EMBARC wireless network. The service is designed for traveling executives who need frequent reports on financial and stock market news and other major news events.

Motorola: (305) 475 5603.

Harbor Software last week introduced HarborView, a visual design tool that enables developers to build client/server applications without writing a line of code. Instead of using a script language, developers build and modify applications by creating diagrams and moving icons on their screen.

The tool then generates code directly from these graphical representations. HarborView costs $3,900 for a development license and $700 for each database driver. There are no run-time fees.

Harbor: (508) 526-1376.

See **Briefs**, *page 35*

ASK Group intros OpenROAD platform for more productivity

Product backed by new support, service offerings.

BY PETER LISKER

Mountian View, Calif.

The ASK Group, Inc. announced last week the first in a series of new products designed to enable users to rapidly prototype and deploy database applications for about 20 hardware and software platforms.

The new product, Open Rapid Object Application Development (OpenROAD), includes a new version — Release 3.0 — of the ASK Group's Windows4GL graphical application development tool as well as a model-based code generator, and it is backed by new support and service offerings.

"Our philosophy with OpenROAD is to provide a platform for building applications from existing components using the highest level development tools available today," said Stephen Weyl, president of the ASK Group's development tools product unit. "The product is absolutely state-of-the-art and is a further step in ASK Group providing facilities to generate enterprise-scale applications without the necessity of writing software code."

ASK Group claims that by using OpenROAD, developers can expect as much as a 10-fold improvement in productivity compared to current application development tools.

WEYL

"ASK Group Windows4GL brought us a 67% reduction in time to develop graphically oriented pipeline management software for transportation and oil companies worldwide," said Chuck O'Leary, a vice president at Modisette Associates in Houston. "Using OpenROAD, we'll be able to improve significantly on that level of productivity and develop applications across multiple database environments."

OpenROAD will support a variety of databases in addition to ASK Group's Ingres database, as well as Oracle Corp. and Sybase, Inc. products. The databases will be supported via custom software drivers available from ASK Group. OpenROAD will also support the automatic control and synchronization of applications deployed on a global basis through enhanced distributed application management.

The new product is based on object-oriented technology that will allow developers to lower maintenance costs and improve reliability by reusing existing objects stored in an application library. The use of database objects and a model-oriented approach to generating code will theoretically allow a reduction in costs for developing applications, according to the company.

OpenROAD implements object-oriented class libraries — essentially objects, components and applications specifically tailored to a user's environment that are stored in an on-line library and can be used repeatedly.

ASK Group is currently working with third-party developers to create application libraries containing commonly used objects — including forms, accounting screens and tax tables — that the company hopes will be available to developers.

"We believe that by bringing object-oriented technology and model-based application development tools to the Ingres envi-

See **OpenROAD**, *page 35*

WORK FLOW

Action enters market for work flow

BY WAYNE ECKERSON

Alameda, Calif.

After several delays, Action Technologies, Inc. last week finally unveiled a work flow product that combines a sophisticated process modeling tool with an open, standards-based work flow engine that automates everything from ad hoc to production-oriented business processes.

Considered to be one of the first vendors to proselytize the idea of work flow and start developing group-enabling technology, Action has been slow to release its work flow products due to an ill-fated relationship with Lotus Development Corp.

Lotus originally planned to bundle Action's work flow engine as an add-on product to its Notes work group computing software. But after several delivery delays, Lotus decided to end its exclusive arrangement with Action and start partnering with any vendor that wanted to develop work flow products for Notes.

Despite the delays, Action is now delivering a work flow tool that is unique for its flexibility and openness, as well as its ability to model and design business processes. This bodes well for the firm because the work flow market is still in its infancy but expected to grow significantly during the next two to five years, according to analysts.

On the design side, the ActionWorkflow System

See **Work flow**, *page 34*

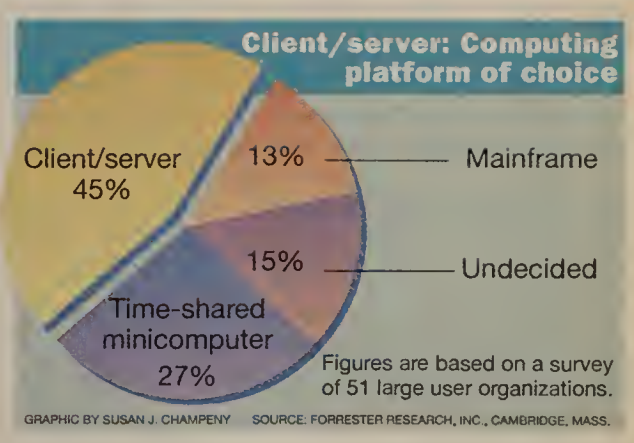
Park City rolls out new client/server apps version

BY BOB BROWN

Chicago

Park City Group of Park City, Utah, this week will announce a new version of its client/server application software featuring a new electronic messaging module and GUI-like interfaces.

The PaperLess Management System 2.1, which is being introduced at the Retail Information Systems Conference in Chicago, is a set of 27 customizable applications designed to automate paper-based work processes.



The client/server-based applications run on local-area networks at remote sites and communicate with central hosts running another Park City software package.

Applications include PaperLess Human Resource Management, PaperLess Cash Management and PaperLess Inventory and Production Management, among others.

The applications rely on electronic mail, work flow and forms technologies, among others, to replace paper-based systems. The software was initially targeted at retail companies with many remote locations, but Park City has since widened its focus to encompass other types of customers.

Release 2.1 of the PaperLess Management System has been redesigned using object-oriented technology, which will enable the company to more quickly respond to changing customer requirements by enhancing existing program modules and adding new ones, said Paul Quinn, the company's president.

The object-oriented technology also enabled the company to add graphical features to its character-based user interface, laying the foundation for Park City to roll out a Windows version

See **Park City**, *page 35*

CLIENT/SERVER TOOLS

Bluestone uses objects to link clients and data servers

BY WAYNE ECKERSON

Mount Laurel, N.J.

Bluestone, Inc. recently announced an object-oriented development tool for building Motif-based client/server applications that is optimized for accessing relational databases.

Called db-UIM/X, the product extends the capabilities of the leading graphical user interface (GUI) builder in the Motif market — Visual Edge Software, Inc.'s User Interface Management for X Systems (UIM/X), which is currently resold by IBM, Hewlett-Packard Co. and Bluestone.

Bluestone's db-UIM/X software enables developers to use the UIM/X front-end point-and-click GUI builder to update and retrieve data stored on Sybase, Inc. SQL Server relational database management systems. Future support is planned for Oracle Corp. and Informix Software, Inc. relational DBMSs.

The unique aspect of db-UIM/X is that it allows developers to treat SQL Server-stored procedures as objects that can interact dynamically with GUI objects via an object request broker (ORB). Bluestone's db-UIM/X supports an end-to-end distributed object computing environment that is simpler to use and offers better performance for accessing relational DBMSs than most client/server development tools on the market today, according to Robert Bickel, director of product sales.

In addition, Bluestone's db-UIM/X does not require developers to learn a new programming or scripting language. All actions, including binding a GUI object to a remotely stored procedure, is done through a point-and-click interface. However, the tool, which is written in C and C++, gives users the option of writing code in those languages.

Bickel said the db-UIM/X is targeted at companies in the financial and insurance industries that have a large embedded base of Motif workstations and Sybase SQL Server relational DBMSs and that are eager to implement high-performance client/server applications.

Currently, Bluestone's db-UIM/X only works with relational DBMSs that contain the necessary stored procedures to support client applications. In the future, db-UIM/X will support a visual programming utility that will let developers build and implement stored procedures.

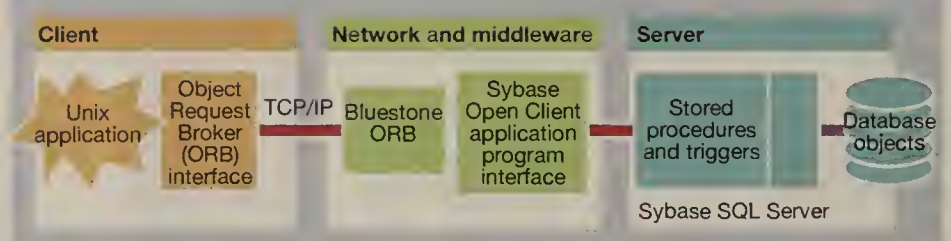
Bluestone's ORB is compliant with the Object Management Group's Common Object Request Broker Architecture (CORBA). The ORB, which can reside anywhere on a Transmission Control Protocol/Internet Protocol network, manages the exchange of information between client and server objects.

Communications between clients, ORBs and servers is handled by remote procedure calls (RPC) that are compatible with the Open Software Foundation's Distributed Computing Environment. The RPCs, along with a proprietary queueing mechanism, allow clients and servers to exchange information in asynchronous and synchronous fashion.

Available in December, db-UIM/X will cost $6,000, which includes Visual Edge's UIM/X GUI builder. A version of db-UIM/X without UIM/X will cost $2,250.

✆Bluestone: (609) 727-4600.

Developing with objects



Bluestone's db-UIM/X for Unix workstations is an end-to-end distributed object computing environment that simplifies development and deployment of Sybase, Inc. SQL Server client/server applications.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: BLUESTONE CONSULTING, INC., MOUNT LAUREL, N.J.

Oracle pushes information revolution

BY PETER LISKER

Orlando, Fla.

To an enthusiastic crowd at the International Oracle Users Group here, Oracle CEO and cofounder Larry Ellison recently outlined a bold vision of the company as the provider of technology that will fuel an information-on-demand revolution.

With massively parallel processors acting as servers, Ellison demonstrated a video-on-demand system running an Oracle7 relational database management system that, by the end of 1994, will be able to support as many as 30,000 simultaneous video, audio, text or graphic data streams.

"We believe that there is a tremendous untapped demand for custom information services that will fundamentally alter the way people interact with information."

Larry Ellison
CEO
Oracle Corp.

The system, employing Oracle Media Objects, Oracle Media Server and Oracle Text Server,all new products to be released in the fourth quarter of next year, will let video, text and information services providers deliver the services to either personal computers or smart televisions.

"We believe that there is a tremendous untapped demand for custom information services that will fundamentally alter the way people interact with information," Ellison said. "We think that within a few years, people will be able sit at home and engage in interactive global shopping, create a personalized news source drawing from all the newspapers in the world and have access to data from any source."

Ellison sought to position Oracle as "the premier provider of client/server technology" and took sarcastic shots at rivals Sybase, Inc. and Microsoft Corp., saying they lack the technological vision needed to meet the needs of the upcoming information revolution.

The demonstration of video on demand was run on an NCube massively parallel computer capable of delivering 1,700 simultaneous data streams, delighting users with multiple video presentations running at 30 frame/sec and broadcast-quality stereophonic sound.

While Ellison was explicit in providing schedules for Oracle products designed to enable information-on-demand applications, notoriously absent were any specifics about who would develop and bring to market a real-time operating system needed by end-user clients to participate in such schemes.

Despite applause from the audience, there were grumblings, as well.

"I just wish [Ellison] would stick to giving me the resources I need at a software level to keep my distributed database network up and running," said a network manager from a major West Coast manufacturing organization.

Work flow

Continued from page 33

provides a four-step methodology that lets users analyze and redesign business processes. The last step in the methodology involves having initiators of the work flow process comment on whether they are satisfied with the quality of work completed, effectively closing the loop on the business processes.

"Action's methodology is based on unique research into human interaction," said Bruce Silver, vice president at BIS Strategic Decisions, a research firm in Norwell, Mass.

Action also offers Windows-based tools for designing and automating work flow applications. One tool is for business analysts to outline work flows based on Action's methodology, while the other is used by programmers to build work flow applications.

The work flow engine, which runs on OS/2 servers and incorporates either Notes or Microsoft Corp. SQL Server database, uses electronic mail and database technology to support the flow of information and work in a firm.

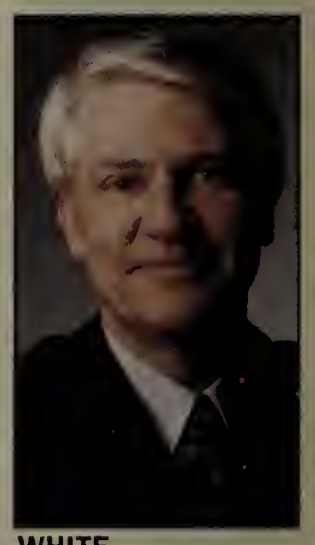
This gives users the flexibility to support both low- and high-end work flow applications, according to Thomas White, president of Action. In contrast, most work flow systems rely on either E-mail or databases as their primary transport engine.

Action has also published application program interfaces, allowing Windows or OS/2 users to access the ActionWorkflow System from front-end tools of their choice, such as Powersoft Corp.'s PowerBuilder or C++. The system also supports Novell, Inc.'s Message Handling Services (MHS), Vendor Independent Messaging (VIM) and Messaging API specifications for E-mail transport.

The ActionWorkflow System is priced by the tool, but the complete system starts at $10,000. The SQL Server version is available now, and Notes and Windows NT versions will be shipped in the fourth quarter.

✆Action: (510) 521-6190.

Persistence pays off



WHITE

Action Technologies, Inc. may not be the first vendor to release a work flow product, but it may be the most venerable.

Established in 1983, Action spent two years developing its first work flow product, the Coordinator, which it subsequently sold to Da Vinci Systems Corp. The Alameda, Calif.-based company then reinvented itself as an electronic mail company and developed the Messaging Handling Service (MHS), which it released in 1987 and later sold to Novell, Inc.

Now with the announced availability of the ActionWorkflow System, Action's ready to reenter the work flow market, which is just now beginning to show signs of life, a decade after Action first opened its doors.

"We have had the good fortune to survive long enough for users' needs to catch up with our technology," said Thomas White, president of Action.

As a veteran observer of the work flow market, White said 1994 will be the year in which many vendors start shipping work flow products and users get serious about testing the efficacy of work flow applications for their environments.

By 1995, some companies will have deployed enterpriswide work flow applications that support 10,000 or more users, he predicted.

However, in the next few years, operating system vendors will challenge work flow vendors by incorporating work flow capabilities into their core operating systems. Consequently, work flow vendors will be forced to add more features to their products to remain competitive.

Such features include the ability to access multiple database types from a single server, integrate with legacy applications, and support higher level management and simulation tools, White said.

BY WAYNE ECKERSON

Park City

Continued from page 33

of the software next year, Quinn said.

The major new application in Release 2.1 is Messaging Plus, a proprietary electronic mail system that lets users mail-enable applications. For example, someone in one store can use the PaperLess Cash Sheet to tally up a day's balance sheet and then send that information to someone in a neighboring store to compare facts. The messaging module will also support the attachment of binary files, such as spreadsheets and word processing documents.

The messaging module works with a new multitiered routing architecture, Quinn said. This architecture enables users to send information created under one application to other local users, regardless of whether they have a copy of that application. The local routers would then have access to a router at a headquarters site to provide for communications between remote sites and to offer host access. Previously, Park City Group only supported a central application router.

Also new in Version 2.1 of the software is support for SQL databases, which can be accessed via the PaperLess Management System applications to fill in forms.

PaperLess Management System 2.1 application modules, which will begin rolling out this month, will cost between several hundred and several thousand dollars, depending upon configuration.

✆Park City Group: (801) 645-2105.

OpenROAD

Continued from page 33

ronment, our customers will be able to dramatically lower the cost of deploying database applications and do so in a more timely and cost-effective manner," according to Pier Falotti, president and chief executive officer of ASK Group.

"OpenROAD provides a scalable desktop-to-enterprise solution for the large installed base of our customers who are increasingly dependent on the database systems that are central to their business," he added.

OpenROAD, to be released in six to nine months, will support Windows 3.1 and Windows NT, Macintosh, OS/2, Unix and OpenVMS operating systems.

At the relational database level, OpenROAD is to provide support for Oracle, Sybase, IBM DB2 and DEC Rdb relational DBMSs, as well as IBM IMS, Hewlett-Packard Co. Allbase and other nonrelational databases. Microprocessor families supported include Intel Corp.'s 80X86 and Pentium, Sun Microsystems, Inc.'s SPARCstations, IBM's RISC System/6000, HP's HP/PA, DEC's Alpha and Motorola, Inc.'s 680X0.

ASK Group also outlined upcoming product plans, including a November announcement of the next release of the Ingres intelligent database.

In addition, OpenROAD will support Windows NT, and the company indicated that the next release of its manufacturing information system, ASK Group's ManMan/X, will support the Informix database and hardware from Sun.

Pricing and configuration information will be announced within 90 days.

✆ASK Group: (510) 769-1400.

BRIEFS

Continued from page 33

Ernst & Young and **Powersoft Corp.** have announced they will offer an interface between Powersoft's PowerBuilder client/server development tool and **Knowledgeware, Inc.**'s Application Development Workbench computer-aided software engineering tool. The interface will cost $4,000 and be available in the fourth quarter from both Ernst & Young and Powersoft.

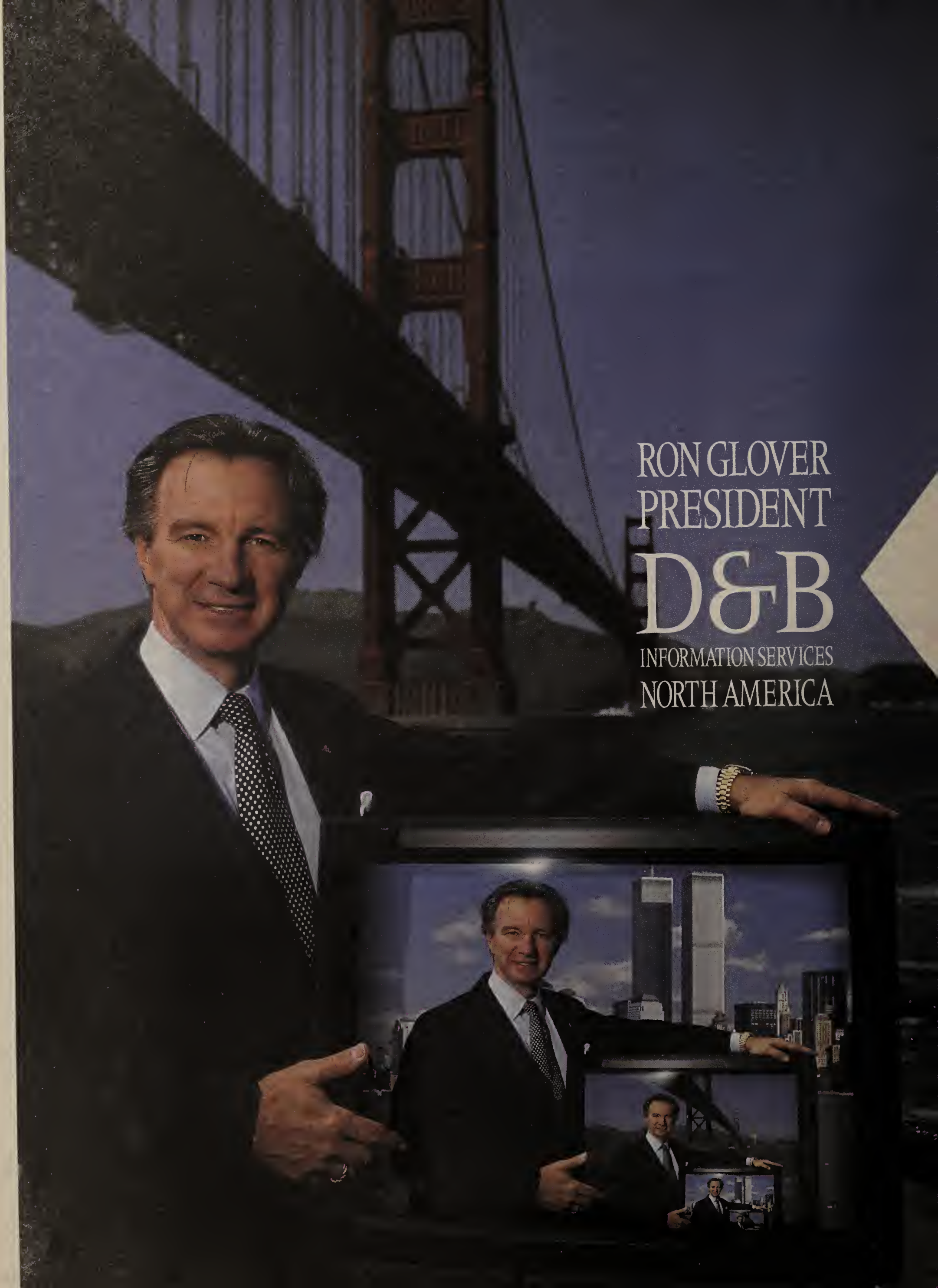
Powersoft: (617) 229-2200.

ElseWare Corp., based in Seattle, this week will announce Font Works, a software package that gives users a comprehensive library of fonts that enables them to receive documents across a network and read them in their original fonts. Font Works, a Windows-based package, costs $129.95 per user.

ElseWare: (206) 448-9600.

NobleNet, Inc. recently announced software that compiles remote procedure calls (RPC) as NetWare Loadable Modules, Windows Dynamic Link Libraries or UnixWare C language executables. Called RPCware, the software works with the transport-independent RPC, supported within Novell, Inc.'s LAN WorkShop developer kit and Sun Microsystems, Inc.'s Network File System. RPCware makes it easier for developers to build client/server applications on NetWare and Unix platforms, complementing NetWare's AppWare strategy.

NobleNet: (508) 460-8222.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Editorial

With a federal judge at the controls, the regional Bell holding companies are taking a wild roller coaster ride when it comes to getting into the cable television business.

Now it doesn't mean a hoot to me whether the RBHCs get the green light to compete with CATV providers. Personally, I'd rather see their money go into net upgrades that would bring new services to corporate users. And, I'll admit, I'm not the most ardent supporter of the local telephone companies. Call it a blanket indictment, but I think it's taken them too long to shed the monopolist mentality and respond to their customers' changing needs.

Be that as it may, this video-programming mess points to the confusion that exists in oversight of the RBHCs and the appalling lack of a clear government telecommunications policy. The Clinton administration wants to build a national information infrastructure, but it hasn't figured out what role should be played by the seven major U.S. corporations that today control access to virtually every home in America.

Consider this: In August, Federal Judge T.S. Ellis III labeled unconstitutional a provision of the 1984 Cable Act barring the RBHCs from owning and operating cable companies in their service areas. Then, two weeks ago, Ellis said his ruling applied only to Bell Atlantic Corp., which challenged the law.

The latter ruling not only seems to defy logic, but also will expand the crazy quilt of regulation under which the RBHCs now labor. As the other RBHCs head to court to challenge the Cable Act in their regions, Bell Atlantic gets a head start — but a shaky one. The law may be upheld elsewhere, and who knows what will happen if the government appeals the original ruling and the case reaches the Supreme Court.

I've never advocated government engineering of industries, a la Japan, but the incongruities in the current regulatory system are a disincentive to investment and slow the development of a national network infrastructure.

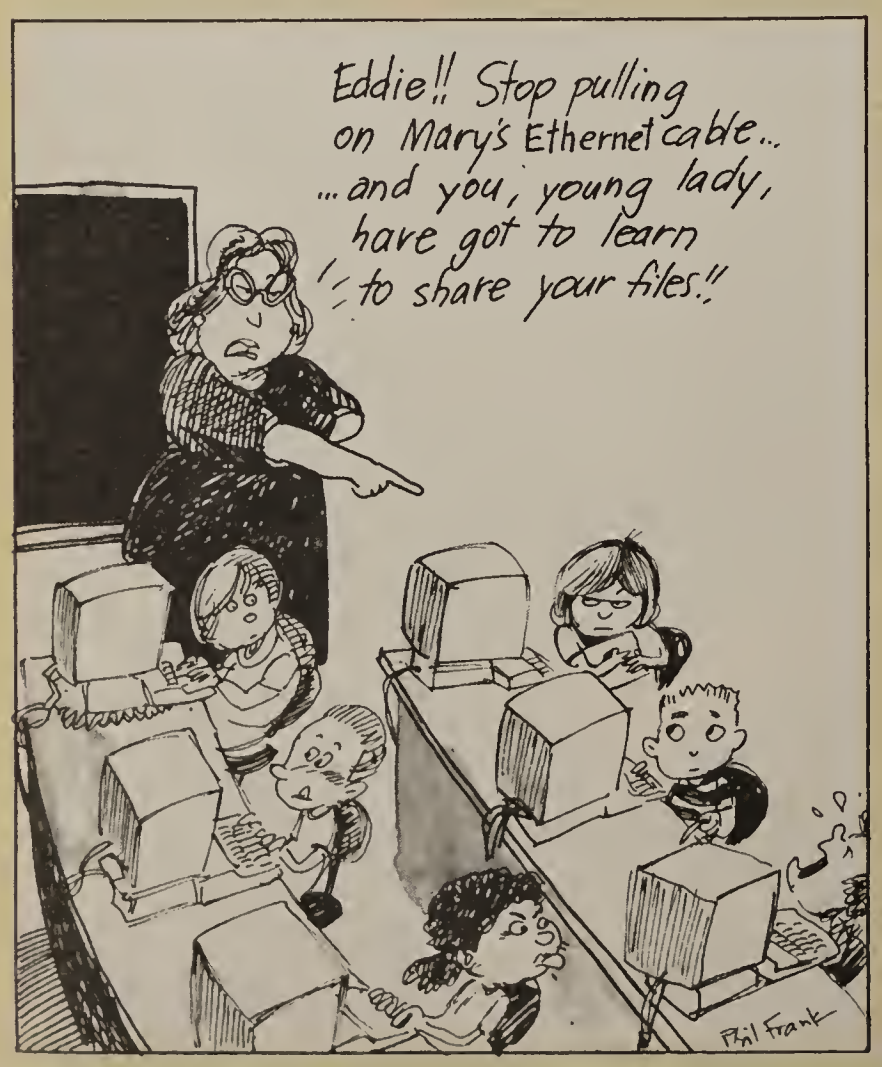
As Reed Hundt prepares to take over at the Federal Communications Commission, the time is ripe for the Clinton administration to draft a coherent policy on RBHC participation in new markets. That policy, which should be spearheaded by Hundt, ought to reflect the changing dynamics of the network industry and the need to spur competition in the local loop.

Without such a policy, you can look forward to years of confusing legal wrangling and lots of wasted opportunities.

JOHN GALLANT

Teletoons

FRANK AND TROISE



DISTRIBUTED COMPUTING

by John R. Rymer

DEC's client/server comeback has bright prospects

Digital Equipment Corp.'s new Open Client/Server Computing Solutions strategy is a determined, innovative effort to jump-start another era of high growth for the company. Yet DEC's new strategy by no means assures its success. The company has much work ahead in order to turn its plans into real products that will serve users' client/server needs. But DEC is on the right track.

DEC's new client/server strategy is firmly rooted in bringing distributed computing into mainstream commercial systems. DEC has been a leader in distributed computing technology for years. It is now applying its expertise to products and services that support client access to all kinds of distributed network services.

Moreover, later this month, DEC is expected to announce a new work group computing system (code-named ObjectWorks) that is an advanced client/server alternative to its current All-in-One office system.

DEC's client/server strategy also promises openness to users. It supports networking standards such as Transmission Control Protocol/Internet Protocol and Open Systems Interconnection; distributed computing standards such as the Object Management Group's Common Object Request Broker Architecture, X.400 mail and X.500 directory services; multiple client operating systems; and three server operating systems: OpenVMS, Unix and Windows NT. DEC will also support the Open Software Foundation, Inc.'s Distributed Computing Environment as a key distributed computing service.

DEC's approach to client/server technology is very similar to the strategies of IBM, Hewlett-Packard Co., NCR Corp. and its other large competitors. However, DEC's focus on solutions employing client/server technology sets it apart. This focus on solutions is the result of Chief Executive Officer Robert Palmer's reorganizing of the company into five vertical market business units during 1992 and early 1993.

The five business units address, broadly, discrete manufacturing and defense; process manufacturing and consumer products; health care; communications and media; and financial services. The new business units act like systems integrators for their customers, selling DEC products, third-party products, and DEC's consulting and integration services in big-bundled deals.

In this context, DEC views inventing new technology as secondary to meeting the requirements of specific industries with cost-efficient, flexible products and services. This approach is ingenious. It organizes DEC's product development, sales, support and consulting resources into a focused, highly capable direct sales channel. The channel puts the acknowledged prowess in distributed systems design and integration of DEC's 15,000 consultants worldwide into the limelight for the first time in the company's history. DEC's network integration services are a real plus for making the client/server strategy work.

Users have never seen a sales channel for client/server computing like the one DEC is building. Channels for client/server systems have been the bane of large systems vendors because these products typically don't generate high enough margins to support conventional direct sales approaches. Most vendors have addressed this problem by seeking to reduce the costs of direct sales channels to match the margins of client/server computing products. DEC is raising the value of its channel for client/server products by adding expertise in specific industries to it.

DEC's vertical industry focus also will change the company's approach to client/server products and technology. DEC is recasting its vast collection of distributed computing services — formerly known as Network Application Support — as a set of client/server frameworks.

Frameworks are integrated bundles of distributed computing software that support specific functions. For example, DEC's new work group computing framework will provide mail, document management and work group coordination system software.

In addition to this foundation, DEC and its partners will build applications in areas such as customer management and publishing.

Other frameworks will address multidatabase integration, technical computing, network management, enterprise mail and transaction processing in distributed environments.

Despite DEC's progress, it has much work left to do. The big issue is how DEC can persuade its 65,000 customers to stay in the fold. DEC's primary appeal to these users is its Alpha AXP hardware, not client/server framework software.

In selling open client/server computing, DEC's first marketing message is: "Alpha AXP is the price/performance leader." That is because DEC's planned frameworks won't be complete for at least a year. Although DEC has products available for some of its frameworks, the company doesn't yet have all of the pieces it needs to complete these frameworks. DEC needs to flesh out existing frameworks and design some new ones from scratch.

DEC also hasn't yet articulated a client/server application development strategy. Application development tools will be included within each framework; however, DEC hasn't said which tools will be common across certain frameworks.

Finally, DEC acknowledges that its efforts to sign up new customers are lagging. Despite Alpha AXP's rosy price/performance numbers, DEC hasn't had much success selling the hardware outside of its installed base. DEC is an also-ran in Unix systems sales, despite heavy investments.

Still, DEC's new strategy promises to have great value for users. The company's commitment to industry-specific solutions will undoubtedly help to redefine enterprise computing as we know it. DEC is getting a head start on competing in this new world.

Users that had lost faith in DEC's service abilities as they move into a new era of distributed computing should take another look. DEC is back on track.

Rymer is editor of *Distributed Computing Monitor*, a monthly report published by Patricia Seybold Group, Inc., a Boston-based research and consulting firm. He can be reached via the Internet at jrymer@mcimail.com.

DIGITAL SIGNATURES

by Bruce Schneier

DSS licensing plan will hurt users

The National Institute of Standards and Technology (NIST), in agreeing to give exclusive license of the Digital Signature Standard (DSS) to Public Key Partners, Inc., (PKP) is doing a disservice to every current and future computer user in the country (*NW*, Sept. 20, page 12).

A digital signature is a mathematical method of mimicking a handwritten signature on a digital document. The mathematics are complicated, but the implications of digital signatures are clear: They potentially enable electronic mail to have the same legal standing as paper mail. Using digital signatures, users can place orders, sign contracts and even transfer money securely over a network.

PKP holds the patent for the most popular digital signature algorithm, known as the Rivest-Shamir-Adleman (RSA) algorithm, and claims patents on the whole concept of digital signature technology. If any U.S. company wants to add digital signature technology to their products, they must pay PKP for the privilege.

Throughout the rest of the world, the RSA algorithm is unencumbered by patents. Because of this, use of RSA for digital signatures has spread rapidly in other countries. There are several international standards for digital signatures, including the ISO/IEC 9796 standard. Only in the U.S. has digital signature standardization lagged, due in part to PKP's patent; companies have been reluctant to implement a standard that includes patented technology.

NIST sought to end PKP's monopoly by developing and promoting DSS as the U.S. standard for digital signatures. DSS uses a different algorithm than RSA; the government applied for and was awarded its own patent. Internal and external NIST documents stated that the intent was to implement DSS throughout the U.S. royalty-free. Many companies expressed concern over the U.S. having a different digital signature algorithm than the rest of the world, while others were pleased that this new algorithm would be royalty-free.

Then in June, NIST announced its intent to give all DSS commercial rights to PKP. This means that any company wishing to implement DSS will have to negotiate a license with PKP. No license, no standard. It will also hit U.S. users with a double whammy: a standard that is incompatible with international digital signature standards and that U.S. users will have to pay to use, as well.

NIST's reasons for agreeing to give PKP the rights to DSS are unclear. Were NIST's lawyers poorly briefed before they entered negotiations with PKP? Does the government have an ulterior motive for wanting the U.S. to have a digital signature standard that differs from the rest of the world?

The agreement between NIST and PKP also includes the use of another PKP patent — one for secret key exchange — in the government's Clipper Chip initiative. Were these two programs linked, contrary to the interests of the government and the people?

Besides being ill-advised, this move to give PKP the rights to DSS may be illegal, as well. A law that's part of the United States Code — known as 35 U.S.C. 209 — prohibits the exclusive licensing of government patents, except in cases where that would further the development and implementation of the technology.

It is clear that this is not one of those circumstances. At least one suit has been filed in federal court attempting to block this agreement, but it is expected to be thrown out due to one of several bizarre technicalities.

The harsh reality is that while it is clearly ill-advised and possibly illegal, NIST will go through with its intentions to give PKP exclusive rights to DSS. And if that happens, U.S. users will end up paying the price.

Schneier is president of Counterpane Systems, a cryptography consulting firm in Oak Park, Ill. His book, *Applied Cryptography*, will be published by John Wiley & Sons this month. He can be reached via the Internet at schneier@chinet.chi.il.us.

Letters

Erase misconceptions

I enjoyed Mark Gibbs' recent column about "Network Fascists" (*NW*, Sept. 13, page 25). As a long-time Macintosh devotee who makes a living primarily supporting personal computer networks, I have certainly encountered network managers who have been unwilling to suport any platform other than the perferred platform.

However, there's one thing he forgot to mention. In order to effectively support users on the other platforms, the network managers need to put aside all the misconceptions they've heard from their buddies (or often their downright hatred of the other platform). Nothing is more unpleasant than being the sole Macintosh user in a company where the network manager:

- Knows nothing about Macintosh.
- Won't learn or even look at a Macintosh.
- Continually makes snide remarks about the Macintosh, particularly in front of superiors and fellow DOS supporters in an effort to get rid of the platform.

Naturally, those comments apply to other platforms, as well.

Thanks for the column!

Wade Williams
Network support specialist
Auburn University
Auburn, Ill.

Stranger in a strange land

As a Macintosh user in a DOS world, I loved Mark Gibbs' article about "Network Fascists" and have shown it to several people, some of whom were not amused. (Fascists, obviously.) Well done!

Janet Michaelis
Kettering, Ohio

No fascists

This is in response to Mark Gibbs' article titled "Network Fascists taking control." I cannot express how disappointed I am in your publication for printing this article. The scenario that Mr. Gibbs described is both very real and timely. The problem I have with the article was in its approach.

First, Mr. Gibbs brought nothing to the table in the article. All he did is throw gas on the fire. As a corporate technology integrator responsible for supporting my clients, I look to publications like *Network World* for information I can use to answer problems like this. All Mr. Gibbs did is play off the emotions of network users.

Second, I find the use of the term "Fascist" extremely inappropriate. I cannot believe that you would condone the categorization within your publication of a group of systems professionals, many of whom are your readers, under the umbrella of one of the most offensive groups of people ever to walk the earth. At a minimum, it was extremely unprofessional.

In short, I found the article both useless and offensive.

John Bartolick
Manager, Technology Integration
Schering-Plough Corp.
Union, N.J.

Mark Gibbs replies: I would first like to address your second complaint: the use of the term Fascist. I would expect most people to understand that I wasn't paralleling the mentality I was discussing with that of the political movement of the same name (I referred to "Network Fascists," not simply "Fascists" — fascism as a concept is much older than its use in the 20th century and, in fact, goes back to ancient Rome).

Further, Webster's Dictionary defines fascism as "a social ideology... that relies on pseudo-religious attitudes and... use of force for getting and keeping power." This is what I was highlighting and what I feel is a real and common attitude in some organizations. My concern with management fascism (note the lowercase f) in general is that it is counterproductive. It stifles and restricts in an age where we desperately need dynamism, cooperation, enthusiasm and business edge.

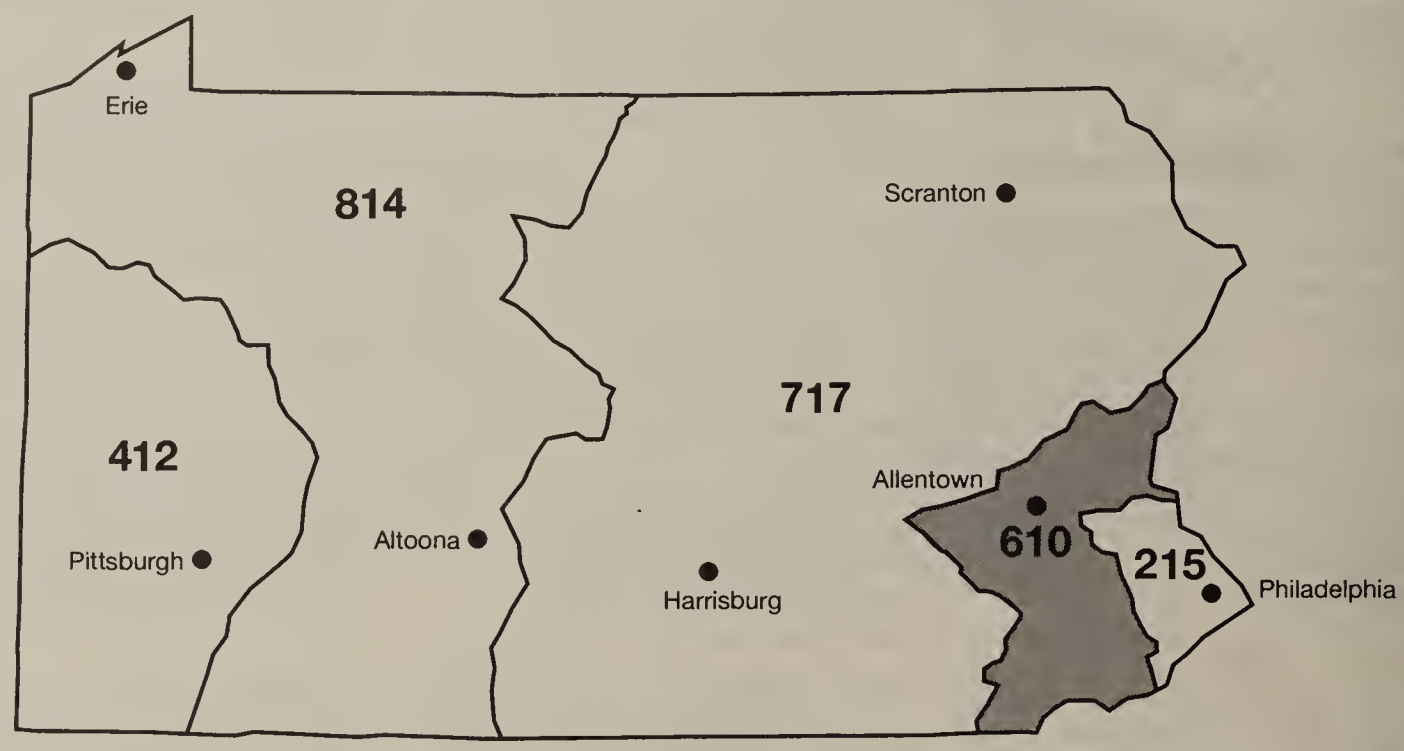
With regard to your first point, my objective was to create awareness and suggest an approach. If anyone's network users have emotions to "play off," those users may have a real grievance. Indeed, many Macintosh users wrote to me to say that these attitudes are real and timely, as you confirm. The worst effect of my article on network users might be the realization that the network is there to support their work — a means to an end and not an end in itself.

Certification plan has problems

I am writing you regarding the article titled "Group pitches certification plan for network pros" (*NW*, Sept. 20, page 1).

See **Letters**, *page 53*

On January 8, 1994, Pennsylvania will add a new Area Code: 610.



For telecommunications managers, this will mean designating 610 as an area code in Customer Premises Equipment as of January 8, 1994. It will also require updating automatic call-routing systems, automatic dialers, modems, fax dialers, electronic networks, and mobile, cellular, and wireless equipment. Your Customer Premises Equipment vendor can advise you on other equipment that might be affected.

For everyone, it will mean dialing the new area code when calling into Pennsylvania's 610 area. It will also mean updating, as appropriate, Area Code 215 speed-dialing numbers to 610 on home and business phones, cellular phones, fax dialers, and other automatic dialers.

Area Code 610 will be operational as of January 8, 1994. Its use will become mandatory for call completion as of January 7, 1995.

For more information, call your Customer Premises Equipment vendor or your telephone company representative.

Bell of Pennsylvania

Bell Atlantic

Buyer's guide

Implementing videoconferencing usually cuts corporate travel costs by 18%, according to Telemanagement Resources International, Inc. of Lake Wylie, S.C.

Thanks to price drops and deployment of standards, videoconferencing takes on

A new look

BY CHRISTOPHER FINN AND VANYA GALANIN

Precipitous price drops and widespread deployment of H.320 video compression and communications standards have enabled network managers to move videoconferencing to new areas of their organizations.

With prices for a portable videoconferencing system supporting four conferences now as low as $15,000, the technology is becoming a decentralized tool that departments and small businesses can enjoy. The $15,000 price tag for a system comprising a color monitor, speaker, microphone, camera, coder/decoder and system controller that can be wheeled from room to room on a rollabout cart is half of what it was just last year.

Rollabout and room systems — the traditional, more expensive systems that large companies use as a centralized resource — have more broad appeal today, thanks to the adoption of interoperability standards. Users with different vendors' systems can now establish videoconferences, making the technology viable for reaching partners outside the organization.

At the same time, vendor compression schemes have advanced, making high-quality video feasible at bandwidths as low as 112K bit/sec. With today's technology, a conference held at 112K bit/sec is comparable in quality to one held a few years ago at 384K bit/sec and, consequently, chews up less in transmission costs.

As an example of this newfound cost-effectiveness, Norfolk Southern Railroad cost-justified videoconferencing among executives in its Norfolk, Va., headquarters and sites in Atlanta and Roanoke, Va., based soley on eliminated travel expenses.

According to Tom Bolt, Norfolk Southern's network operations manager, the system boasts hard-dollar savings of more than $50,000 per month, but the key benefit is the executives' time savings. Now the railroad is looking to save even more by conducting videoconferences among interoperable equipment at other railroads that are members of the American Association of Railroads, Bolt says.

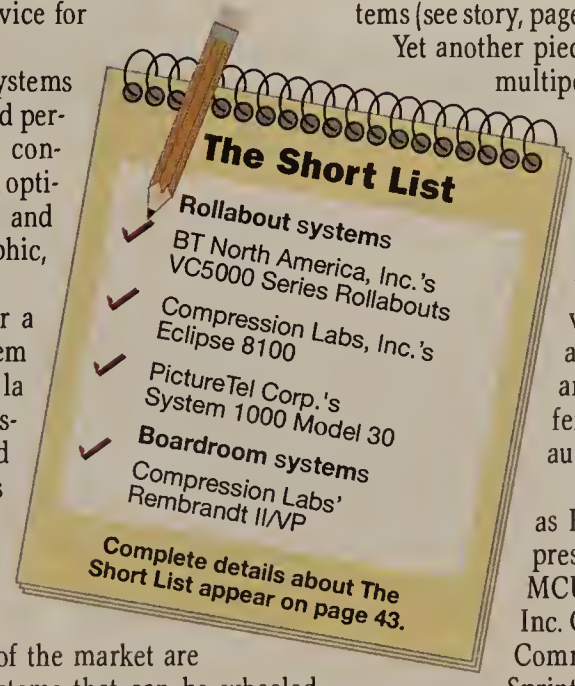
Interoperability standards are needed because videoconferencing units come in all shapes and sizes with an abundance of options, and more are arriving monthly.

At the high end of the market are boardroom systems — also known as integrated room systems, which are expensive, with prices well into the six-figure range. These systems typically include a number of monitors, cameras, microphones, speakers, a control panel and such peripherals as an electronic whiteboard and a document stand.

All the components plug into a codec, which converts analog signals to digital format and passes that digital information to a network access device for transmission.

Boardroom systems are usually installed permanently in large conference rooms with optimum lighting and acoustics (see graphic, page 43).

Putting together a high-end system tends to be an a la carte venture. Customers are offered many choices when it comes to choosing components that will meet their needs.



In the middle of the market are basic rollabout systems that can be wheeled around from room to room and cost anywhere from $25,000 to $60,000. These units generally include a single monitor and camera, some peripherals, and a choice of compression algorithms.

New to the scene are rollabout units that break the $20,000 price barrier and comprise the low end of the market. These units feature the same basic circuitry as their higher priced counterparts but generally offer smaller monitors and come in a plug-and-play configuration with fewer options for both compression algorithms and network interfaces.

These low-end units have seen the greatest amount of acceptance in recent months, and they will suffice for most full-blown video applications. In addition, their modular construction allows for growth into higher level mid-range platforms.

Another type of videoconferencing unit just coming to market is the desktop unit. This emerging class of equipment is really a mix of competing technologies, including personal computer-based units and stand-alone videophones. Some support videoconferencing over local-area networks, while others are geared toward interoperability with remote room systems (see story, page 45).

Yet another piece of video hardware is the multipoint conferencing unit (MCU). MCUs, which can be purchased with a videoconferencing system or bought separately, let users establish multipoint videoconferences. Each video codec is connected to an MCU, which arbitrates among the parties, like a conference call bridge does for audio-teleconferences.

Codec manufacturers such as PictureTel Corp. and Compression Labs, Inc. (CLI) make MCUs, as does Video Server, Inc. Carriers such as AT&T, MCI Communications Corp. and Sprint Corp. offer MCU rental services (*NW*, Aug. 23, page 42).

Deciding which type of videoconferencing unit to purchase is largely a matter of choosing the one that best meets users' needs. But determining those needs will require a very thorough needs assessment.

For instance, engineers often present technically oriented information during videoconferences and will need a system that has cameras offering high-resolution, multimagnification images. This camera type allows for sophisti-

Continued on page 42

Videoconferencing systems

Company	Product	System type	Bus type	Standards (1)	Compression	Frame rate (max./avg.)		Signal-to-noise ratio	Resolution formats	WAN speed support (K bit/sec)									Mux features		Data channels	System features				Price	Warranty for parts and labor (in months)
		B = Boardroom R = Rollabout	I = ISA O = Other E = EISA P = Proprietary	1 = H.242 2 = H.230 3 = H.233 4 = H.DLL 5 = G.711 6 = G.722 7 = G.728 O = Other	H = H.261 P = Proprietary	H.261 (frame/sec)	Proprietary (frame/sec)		C = CIF P = Proprietary Q = QCIF	56	64	112	128	256	336/384	768	T-1	E-1	Integral inverse mux	2X56 inverse mux	L = Low speed H = High speed	Auto-tilt, -pan and -zoom	Picture-in-picture	Far-end camera control	Monitors		
BT North America, Inc. (800) 872-7654	VC5000 Series Rollabouts	R	O	1, 2, 5, 6	H	30/15-20		47dB	C, Q	✔		✔			✔	✔	✔	✔		✔	L, H	✔	✔	✔	1-3	$49,950-$66,500	3
	VC5000 Series Rollabouts (2)	R	O	1, 2, 5, 6	H	30/15-20		47dB	C, Q	✔		✔			✔	✔	✔	✔		✔	L, H					$31,950-$36,000	3
Compression Labs, Inc. (408) 435-3000	Eclipse 8100	R	I	1, 2, 5, 7, O	H, P	15/12	15/12	NA	Q, P	✔	✔	✔	✔							✔		✔	✔		1	$19,900-$22,900	3
	Eclipse 8100 i	R	I	1, 2, 5, 7, O	H, P	15/12	15/12	NA	Q, P	✔	✔	✔	✔							✔		✔	✔		1	$24,900-$27,900	3
	Rembrandt II/VP codec and Gallery Room System	B	P	1, 2, 5, 6, 7, O	H, P	30/30	15/NA (4), 30/NA (5)	55dB	C, P, Q	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	L, H	✔	✔	✔	1-2	$67,000-$85,000	12
GPT Video Systems (404) 263-4781	System 261 A Codec	B, R	O	1, 2, 5, 6	H	30/30		>60dB	C, Q	✔		✔	✔	✔	✔	✔	✔	✔		✔	L, H	✔	✔	✔	2	$26,000	4
Hitachi America, Ltd. Telecommunications Division (404) 446-8820	CA-200 VideoConferencing System	R	P	1, 2, 5	H, P	15/15	15/NA	NA	C, P, Q	✔	✔	✔	✔								L	(3)	✔		1	$13,900-$15,000	3
Mitsubishi Electronics America, Inc. (800) 422-5862	Mitsubishi MVC-8100	B, R	P	1, 2, 5, 6	H, P	15/12	15/12	>65dB	C, P, Q	✔	✔	✔	✔	✔	✔					✔	L, H	✔	✔	✔	1	$45,000-$49,500	12
NEC America, Inc. (800) 321-4026	VisuaLink 5000 NETEC Series Video Codec	R	P	1, 2, 4, 5, 6, O	H, P	30/15-30	15/7-15	53dB	C, P, Q	✔	✔	✔	✔	✔	✔	✔	✔	✔			L, H	✔	✔	✔	1	$23,900-$55,000	24
Panasonic Broadcast & Television Systems Co. (201) 348-7470	Vision Series 200: WG-V510 Audio Video Codec	R	P	2, 5, 6, O	H	15/15		45dB	C, Q	✔		✔			✔				✔	✔	L	✔	✔	✔	1	$49,950	12
PictureTel Corp. (800) 716-6000	System 1000 Model 50	R	E, I	4, 5, 6, 7	H	15/10		53dB	C, Q	✔		✔			✔				✔	✔	L	✔	✔		1	$19,995	12
	System 1000 Model 30	B	E, I	4, 5, 6, 7	H	15/10		53dB	C, Q	✔		✔			✔				✔	✔	L		✔		1	$13,995	12
	System 4000 Model 400E	R	P	3, 5, 6	H, P	15/11	15/10 (6),15/12 (7)	53dB	C, P, Q	✔		✔			✔	✔			✔	✔	L, H	✔	✔		1	$34,500-$42,000	12
	System 4000 Model 150E	R	P	3, 5, 6	H, P	15/11	15/10 (6),15/12 (7)	53dB	C, P, Q	✔		✔			✔	✔			✔	✔	L, H	✔	✔		1	$24,500	12
	System 4000 Model 200E	R	P	3, 5, 6	H, P	15/11	15/10 (6),15/12 (7)	53dB	C, P, Q	✔		✔			✔	✔			✔	✔	L, H	✔	✔		1	$30,500-$38,000	12
	System 4000 Model 600E	B	P	3, 5, 6	H, P	15/11	15/10 (6),15/12 (7)	53dB	C, P, Q	✔		✔			✔	✔			✔	✔	L, H	✔	✔		1	$41,500-$49,000	12
	System 4000 Model 800E	B	P	3, 5, 6	H, P	15/11	15/10 (6),15/12 (7)	53dB	C, P, Q	✔		✔			✔	✔			✔	✔	L, H	✔	✔		1	$48,500-$56,000	12
	System 4000 Classroom System	R	P	3, 5, 6	H, P	15/11	15/10 (6),15/12 (7)	53dB	C, P, Q	✔		✔			✔	✔			✔	✔	L, H	✔	✔	✔	1	$57,500	12
VTEL Corp. (800) 856-8835	Benchmark 235 and Benchmark 227	B	I	1, 2, 5, 6, 7	H, P	30/10-16	30/10-16	50dB	C, Q	✔		✔			✔	✔	✔			✔	L, H	✔	✔	✔	2	$52,500-$75,000	12
	VisionPlus 125	B, R	I	1, 2, 5, 6, 7	H, P	30/10-16	30/10-16	50dB	C, Q	✔		✔			✔	✔	✔			✔	L, H	✔	✔	✔	1	$37,500-$42,500	12

Products highlighted by color were selected for The Short List.

FOOTNOTES:
(1) All products support H.320, H.261 and H.221.
(2) Product is actually VC2000 series codec integrated into VC5000 series.
(3) Product has zoom only.
(4) With CTX.
(5) With CTX Plus.
(6) With Hierarchical Vector Quantization.
(7) With Software Generation 3.

CIF = Common Intermediate Format
EISA = Extended ISA
ISA = Industry Standard Architecture
NA = Not available
QCIF = Quarter CIF

SOURCE: TELECHOICE, INC., VERONA, N.J.

Continued from page 41

cated collaboration on technical documents.

When network managers need to bring high-level executives together, they may want a videoconferencing unit with large monitors and codecs operating at 384K bit/sec so that each participant can clearly see one another and large groups can be accommodated.

Once needs are determined, system selection comes down to the following criteria: architecture, features, standards support, interoperability, performance, upgradability, net service compatibility, flexibility and ease of use.

The codec is the heart of the videoconferencing system architecture. In addition to converting analog video and audio signals to digital information, codecs determine which bits need to be transmitted to recreate picture and sound.

Until recently, manufacturers developed different codecs to address various system requirements. For example, CLI developed the Eclipse to run over narrow bandwidths. Therefore, Eclipse's architecture is very different from the company's Rembrandt II/VP system, which runs over higher speed circuits.

In the future, as the cost of bandwidth falls, manufacturers will develop a single codec architecture to support an entire product line. This will increase economies of scale and lower prices even further.

Another recent source of cost reduction is the move to equip codecs with general-purpose CPUs instead of application-specific integrated circuits (ASIC) for video and audio signal processing.

CLI, PictureTel and VTEL Corp. all use the basic processing infrastructure of Intel Corp.'s ubiquitous 80486 with the addition of specialized cards for video and audio processing. BT North America, Inc. strictly uses ASICs in its codecs. The advantage of using specially designed circuits is that they do a better job of coding video.

In another effort to increase economies of scale, vendors are moving toward building a single codec that is capable of supporting a range of systems. For more than two years, VTEL has had a single codec that supports large group systems. This single codec is integrated into VTEL's PC-based system architecture, which enables users to expand the system using industry-standard add-on boards.

Theoretically, codecs based on common PC platforms have the advantage of being more open to third-party development. For a codec to be considered truly open, its manufacturer must make public all the information third parties need to build products that can replace any functionality within the codec.

Since nearly all codec manufacturers compete on the basis of their products' clever compression algorithms or ease of use, they keep proprietary much of the information about their codecs' functionality. However, BT North America has published all the proprietary protocols that its codecs use.

The Short List

Videoconferencing

The Short List highlights products that Network World *recommends you examine during the purchasing process for boardroom and rollabout videoconferencing systems. Products included on The Short List meet the buying criteria outlined here and, in some cases, offer additional useful features. Those criteria reflect the needs of users with multivendor enterprise networks. Your criteria may differ based on network configuration and application needs.*

Rollabout systems

■ **BT North America, Inc.'s VC5000 Series Rollabouts.** This series of products offers strong support for the Telecommunication Standardization Sector H.261 standard. BT North America designed the coder/decoder used in the series around the H.261 standard from the beginning, whereas other vendors had to retrofit their codecs to support the standard. Building H.261 into its codec from the ground up gives the firm more experience with the standard than most other vendors.

While the VC5000 Series Rollabouts are an excellent choice for high-bandwidth, high-quality applications at speeds up to E-1, they remain extremely flexible with high- and low-speed data channels. They support both Common Intermediate Format (CIF) and Quarter CIF (QCIF) video resolution standards, as well as G.711 and G.728 audio standards. Prices range from $31,950 to $66,500.

■ **Compression Labs, Inc.'s Eclipse 8100.** This is a relatively low-cost package that comes with an integrated channel service unit, monitor and codec on a rollabout chart. It comes equipped with support for H.261 and the firm's CTX compression algorithms, has on-screen diagnostics and can literally be installed in minutes.

The Eclipse 8100's list price starts at $19,900, which buys a 20-in. monitor and hand-held remote control. Its most obvious allures are its ease of installation and operation, and relatively low cost.

■ **PictureTel Corp.'s System 1000 Model 30** is a full-featured rollabout system with a low base price of $13,995. This system adheres to most major standards running at speeds from 56K to 384K bit/sec.

It features an intuitive system controller with standard far-end camera control. It is based on an Intel Corp. 80486 architecture, has integrated acoustic echo cancellation and comes equipped to work with a multipoint control unit. The System 1000 Model 30 offers an extremely low price for a workable videoconferencing unit.

Boardroom system

■ **Compression Labs' Rembrandt II/VP.** It offers the highest frame rate and best motion compensation of any codec, thanks to its support for the company's proprietary CTX Plus compression algorithm.

The codec used in this system is one of the main reasons why Compression Labs has long dominated the high end of the videoconferencing market. The Rembrandt II/VP offers both CIF and QCIF resolution, and can be operated at bandwidths from 56K bit/sec to T-1.

Prices range from $67,000 to $85,000.

Codec makers work with selected third parties to bring increased functionality to their products.

For example, virtually all codec manufacturers have agreements with inverse multiplexer manufacturers, such as Ascend Communications, Inc. and Teleos Communications, Inc., to resell and package their network access products with videoconferencing units.

In selecting videoconferencing equipment, it is almost always necessary to go beyond published specification information. This is especially true when it comes to interoperability testing among codecs.

Inverse muxes spread a high-speed data stream — such as a 384K bit/sec channel — across multiple switched 56K/64K bit/sec circuits, making it feasible to conduct videoconferences over low-cost switched digital data services (*NW*, May 17, page 41).

CLI resells Ascend's inverse multiplexers. As a result, Ascend inverse muxes can be controlled directly through the CLI control panel. While other companies' inverse multiplexers will work with CLI codecs, they cannot be controlled via the videoconferencing system control panel, which forces the use of the inverse mux administration terminal.

Another example of how openness can be an advantage is that it is up to each codec manufacturer to determine how users will be able to employ collaborative software in their systems.

To make its stand-alone codec systems more of an open platform for systems developers, PictureTel recently defined and published application program interfaces (API) that allow applications developed for one codec system to be ported to PictureTel systems.

The APIs allow access to all of the codec's functionality, from call setup to collaborative screen sharing. The APIs have been used, for example, to develop special applications for the banking and surveillance industries.

CLI publishes a controller command language that provides similar capabilities for its Rembrandt codecs.

Codecs also differ with respect to the various types and number of peripherals they can support. Some systems, such as CLI's Eclipse, come with one microphone with expansion for only one additional microphone, while NEC America, Inc.'s VisuaLink 5000 NETEC Series Video Codec and Mitsubishi Electronics America, Inc.'s Mitsubishi MVC-8100 allow for as many as six microphones.

Other systems, such as PictureTel's System 1000 models, will only allow one telephone line to be added for audio-only conferencing. And it may be expensive or impossible to overcome these limitations.

By 1995, 98% of all dial-up videoconferencing will be at speeds of 384K bit/sec and lower, according to Gartner Group, Inc., a consulting firm in Stamford, Conn.

For broad peripheral support, organizations should look for low-speed RS-232 as well as high-speed V.35 or RS-449/422 data interfaces, in addition to ports for multiple monitors such as composite, S-Video, analog red, green and blue output, and connectors for VGA output. Of all the products in the Buyer's Guide chart on page 42, only BT North America's VC5000 Series Rollabouts support all possible video outputs.

For organizations considering international videoconferencing, phase-altering line (PAL) video format will be needed, as will support for multiple dialing modes such as V.25bis in Canada and X.21 in Europe and Asia.

ASSURING INTEROPERABILITY

In selecting videoconferencing equipment, it is almost always necessary to go beyond published specification information. This is especially true when it comes to interoperability testing among codecs.

In December 1990, the Telecommunication Standardization Sector (TSS) — formerly the Consultative Committee on International Telephony and Telegraphy — finished a set of five recommendations that collectively define how audio/visual compression devices can interoperate.

The H.320 standard describes the process for making a video call and establishes the roles that the other four recommendations — H.261, H.221, H.242 and H.230 — play in this process. H.261 presents the general rules of communications for encoding and decoding digital video, and defines two resolutions: Common Intermediate Format (CIF) — also referred to as full CIF — and Quarter CIF (QCIF).

CIF calls for codecs to code at a maximum video rate of 30 frame/sec, with 288 lines of luma pixels per frame, 352 luma pixels per line, 144 chroma lines per frame and 176 chroma pixels per line. With QCIF, the pixel and line numbers are both halved, providing a lower resolution picture. End users should make sure their codecs at least support QCIF for interoperability.

BT, GPT Video Systems and Hitachi America, Ltd. only sell standards-based systems. Vendors with decidedly proprietary pasts are moving quickly to extensive standards support, too.

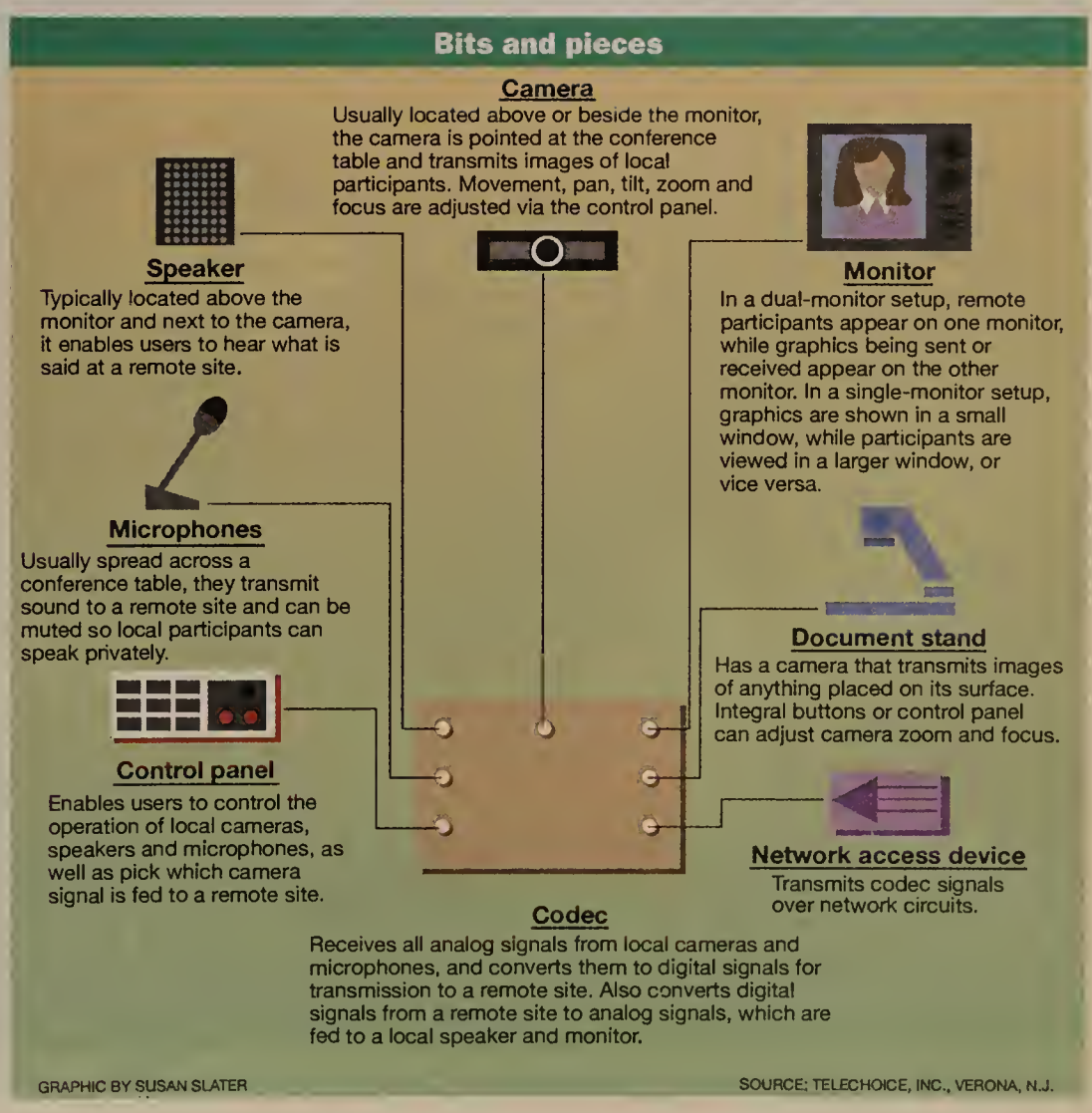
PictureTel, a vendor with a large installed proprietary base, has models that offer standards-based compression algorithms, for instance. All VTEL systems conform to TSS standards as part of their basic configuration. Still, the existence of standards does not guarantee interoperability.

According to Richard Schaphorst, a member of the U.S. delegation to the TSS committee that developed the H.261 scheme, H.261 defines the protocol for the interchange of information that will enable one vendor's videoconferencing unit to display video and play audio generated by another vendor's system. It does not define how picture and audio signals are encoded, thus providing no guarantee for quality. Picture and audio quality are still left up to the vendors.

While there is no formal group charged with the task of testing videoconferencing interoperability, vendors are finding ways to match up their wares (see story, page 46).

Continued on page 44

Bits and pieces



GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC., VERONA, N.J.

Continued from page 43

Selecting a codec might be simpler if there were objective measures to define the performance of video systems.

But nearly everyone from users to manufacturers agrees that it is currently impossible to make valid comparisons of picture quality based on isolated video engineering specifications. The reason is that codecs use a broad range of algorithms to do the same thing — strip unnecessary elements and noise away from a video frame before it is transmitted.

On an extreme macrolevel, users can compare the frame rate and resolution that the codec supports to get some measure of performance. These figures will vary by unit and the algorithm employed at the time. But all things being equal, a higher frame rate represents a smoother picture and better motion handling. Similarly, support for higher resolution should yield a more detailed picture.

This may not always be the case, however. A codec may be able to generate 30 frame/sec when the picture consists of a person sitting still and talking. However, if the person starts walking around and gesticulating excitedly, the actual frame rate will most likely decline significantly.

For this reason, the frame-per-second rate listed by some manufacturers as minimum thresholds must be interpreted very broadly.

BT North America and CLI quote maximum frame rates of 30 frame/sec, and only CLI, with its Rembrandt II/VP systems, quotes an average rate of 30 frame/sec.

When trialing systems, users should have a person at the remote site wave his hands wildly and judge the effects on the picture.

Wayne Mullins, president of Management and Service Technologies Association (MASTA), a teleconferencing systems integrator in Raleigh, N.C., notes that the most common deficiency that users notice is bad motion compensation or frame rate slowdowns. "When this [deficiency] occurs, it points out that this is not like broadcast television," he says. "It hurts the quality of the communication."

Management Recruiters International, Inc. of Cleveland uses video-conferencing to conduct long-distance job placement interviews. The average cost of an on-site interview is $1,700, compared to $250 for a video interview.

Similarly, a codec supporting full CIF resolution is not guaranteed to provide high-quality pictures. The codec manufacturer may have used a crude compression algorithm that does not help make the decoded picture any better.

Some codecs, such as PictureTel's System 4000, are able to automatically select the videoconferencing system's native proprietary algorithm or a standards-based algorithm as part of the handshaking process. Mitsubishi's MVC-8100 provides Automatic Algorithm Adjustment that automatically chooses the optimum algorithm that both codecs support.

Other codecs, such as those offered by CLI, require user selection of either proprietary or standards-based algorithms. CLI even has two selectable proprietary algorithms that offer varying performance levels.

For comparison sake, remember that a proprietary algorithm will generally provide higher quality video than the standard. This is because companies have focused their development efforts on their proprietary algorithms, which can be optimized to work at particular bandwidths.

However, chipsets have been designed to run standard algorithms extremely efficiently. This process is costly because it requires specialized processors but gives customers an alternative to making the trade-off between picture quality and standards-based interoperability.

Bob Bodine, director of audiovisual teleconferencing at Kaiser Permanente decided to buy GPT equipment based on the vendor's commitment to standards. "I knew the world was coming to standards, and GPT, at the time, was one of the few vendors promoting the emerging standards," he says. "I do not want to be tied to a single vendor."

While there is some question whether a proprietary or standard algorithm is desirable, codecs should have a high signal-to-noise ratio. All electronic equipment generates some random electrons (noise) and mitigates the quality of the signal that passes through components.

The signal-to-noise ratio gives a relative measure of how much noise a piece of equipment is generating. A good signal-to-noise ratio is 50 db.

Signal-to-noise must be considered system-wide. The system component with the lowest signal-to-noise ratio will set the signal-to-noise level for the entire system. Most units fall within an acceptable range of 47 db and higher. BT North America's VC5000 Series Rollabouts boast a signal-to-noise ratio of 47 db, while GPT's System 261 A Codec posts a 60-plus db figure.

"I knew the world was coming to standards, and GPT, at the time, was one of the few vendors promoting the emerging standards. I do not want to be tied to a single vendor," says Bob Bodine.

In the end, the video picture is subjective. There may not be a strict correspondence between the objective measures of a codec's performance and the subjective perception of picture quality. Codec manufacturers decide which combinations of motion handling and clarity generate the best perceived picture quality.

However, Hitachi enables users to determine the clarity/motion-handling trade-off themselves by making selections from a setup menu presented when the videoconference is being established. This feature makes it possible to set the codec to maximize clarity for a video call during which little movement is expected.

THE SOUND OF VIDEO

While the quality of video is what many end users worry about most, audio is actually the most critical component of a videoconfer-

ence. Commonly cited figures indicate that, on average, between 60% and 70% of information in a videoconference is conveyed through sound.

Broadly, the audio component of a videoconferencing system should be evaluated via a few key criteria, including standards support and how the system handles acoustic echo.

Some manufacturers' units simultaneously support the older G.711 and G.722 standard audio algorithms requiring 64K bit/sec of audio bandwidth and the newer G.728 algorithm, which needs only 16K bit/sec. These units include all CLI models, the NEC VisuaLink 5000 NETEC Series Video Codec and PictureTel's System 1000.

As a result, an end user running a conference at 112K bit/sec can choose G.728 audio to make more bandwidth available for improved picture quality or G.722 for improved audio quality at the expense of video quality.

Currently, the boost in video quality gained from using G.728 is greater than the corresponding drop in audio quality. This discrepancy in the trade-off should increase as manufacturers gain experience with narrowband audio algorithms.

Continued on page 46

Video's last frontier

Videoconferencing vendors are starting to explore their last frontier — the desktop. And it won't be long before they have the territory totally mapped out.

A group of diverse vendors, including such giants as Intel Corp., BT North America, Inc., Northern Telecom, Inc., Motorola, Inc. and smaller concerns such as Datapoint Corp., Intervision Systems Corp. and Nuts Technologies, Inc. have rolled out videophones, personal computer-based and local-area network-based desktop video products.

Analysts expect these products to quickly mature and drop in price, increasing the likelihood that vast numbers of users will be clearing off a space on their desks for a videoconferencing unit in the latter half of this decade.

The potential benefits of desktop videoconferencing are undeniable. Quickly being able to meet face-to-face with important business partners and the ability to collaboratively view and change graphics are just two such benefits.

But video must still clear several hurdles before it becomes anchored to the desktop. The type of desktop video device that eventually wins favor with users and the cost of desktop video are the major hurdles.

There are essentially three classes of desktop video equipment currently for sale today (see graphic, this page).

First, there is the digital videophone, which is essentially a telephone with a self-contained camera, monitor, microphone, speaker and coder/decoder.

Video phones are usually attached directly to an Integrated Services Digital Network Basic Rate Interface (BRI) line or a switched 56K bit/sec service, support the Telecommunication Standardization Sector's H.261 standard and can interoperate with room-based videoconferencing systems.

Examples of these units are BT North America's VC7000 and Hitachi America, Ltd.'s DP-200.

Next are PC-based desktop video systems that add a small camera and board-based codec to existing PCs. The PC monitor is used to display video images, while sound is played on an attached speaker or through a voice board.

PC-based desktop video units require a dedicated network interface, typically an ISDN BRI or switched digital connection. Examples of this type of device include Compression Labs, Inc.'s Cameo, Northern Telecom's Visit and PictureTel Corp.'s Live PCS-100. TeleChoice, Inc. of Verona, N.J., has been testing Northern Telecom's Visit system for some time. While Visit's appeal is undeniable, the cost may not be practical for many users.

The third type of desktop video device is essentially a PC-based desktop video unit attached to a LAN.

In addition to adding a camera, codec and speaker to a PC, these products use LANs to transport video images.

While LAN-based desktop video units may seem an ideal and economical solution, the packet mode transport methods used on Ethernets and token rings are ill-suited to the needs of video traffic, which requires isochronous channels that transmit data at a constant bit rate similar to a circuit-switched link.

Yet vendors are starting to introduce products that mitigate these LAN transmission problems. Intervision's inVision provides compressed video over standard Ethernet networks for Windows-based PCs.

Datapoint offers video switching systems that provide compressed video over specialized LAN connections in an Arcnet environment.

Once users make a particular type of desktop video unit popular, the price of that unit needs to drop. So far, early units have had minimal acceptance, mostly due to their high cost of $5,000 to $10,000 per user and limited network interfaces.

Various silicon chip developers — Intel and Motorola among them — are working to enable codec functions to be performed at the chip level, which would go a long way toward bringing the cost of video down to acceptable levels. Many of today's devices require entire processing boards to handle video. Chip-level codecs will reduce that hardware to a fraction of what is required today.

Most analysts acknowledge that desktop video needs to cost somewhere between $1,000 and $2,000 per user to be widely deployed. Products priced in that range should be available sometime next year, analysts say.

BY CHRISTOPHER FINN

Video-to-desktop options

Desktop device	Characteristics	Pros	Cons	Companies offering products
Digital videophones	• Adds a small camera and monitor to telephone handset. • Video sent over dedicated network connection at 112K to 128K bit/sec.	• Does not interfere with LAN performance. • Not tied to PC. • Interoperates with other H.261-compatible systems.	• Expensive ($5,000-$7,000). • Requires additional space on desktop. • Requires high-speed WAN interface, such as ISDN, to desktop.	AT&T Communications, Inc., BT North America, Inc., Hitachi America, Ltd.
PC-based video	• Adds camera, microphone and video processor board to existing PCs. • Video sent over dedicated network connection at 112K to 128K bit/sec.	• Does not interfere with LAN performance. • Utilizes existing PC monitor and processor, making it easier to integrate with multimedia applications. • Interoperates with other H.261-compatible systems.	• Expensive ($5,000-$6,000), but coming down in price. • Requires high-speed WAN interface, such as ISDN, to desktop. • Limited functionality, compared to room or rollabout system.	Compression Labs, Inc., Northern Telecom, Inc., PictureTel Corp.
LAN-based video	• Adds camera, microphone and video processor board to LAN-attached PCs. • Utilizes LAN connection for video transport.	• Potentially inexpensive and just coming to market. • Utilizes existing PC monitor and processor, making it easier to integrate with multimedia applications. • Can be used to support groupware applications. • Easy to install on each workstation.	• Today's LANs do not yet readily support video traffic. • Unclear how video will be sent over wide area. • Current offerings are not H.261-compatible. • Limited functionality, compared to room or rollabout systems.	Datapoint Corp., Intel Corp., Intervision, Inc., Microsoft Corp.

SORCE: TELECHOICE, INC., VERONA, N.J.

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Another factor affecting audio is echo cancellation. Acoustic echo is created when speech emanating from a speaker at one site is picked up by a microphone at that site and rebroadcast.

Echo cancelers make an acoustic model of the room and compensate accordingly. When the audio portion of a videoconferencing system is installed, the speaker generates white noise. The echo canceler stores the digital prints of the various white-noise echoes.

As it receives incoming speech signals, the canceler records these, as well. Before the echo canceler transmits outgoing signals, it checks them for possible echoes of the received incoming signals. If it detects any similarities, it deletes these portions of the signal from the outgoing signal.

The most significant criteria for evaluating acoustic echo cancelers are convergence time, tail length and acoustic echo, and return loss enhancement.

Convergence time measures how long it takes for the echo canceler to make up for such changes in the room as a door opening or a chair squeaking. A good benchmark figure is less than 75 msec.

Tail length measures the maximum distance an echo travels before it is canceled. Echo will often take a roundabout path to the microphone, bouncing off several walls in the process.

Therefore, the longer the tail length, the better. In general, a good tail length is usually between 200 and 300 msec.

Users not well versed in echo cancelation have a simple way to determine how different vendors' echo cancelation works — the clapper test. Just have a person at the remote end of the videoconference clap his hands in front of the microphone, then listen to what comes back. But be careful to make sure that the remote site was not set up to absorb echoes.

CANDID CAMERA

Just as a videoconference's sound quality can be no better than the quality of what was picked up by the microphones, the video quality will depend on what was picked up by the camera.

The objective criteria for evaluating camera quality includes a signal-to-noise ratio measured in decibels, the ability to adjust the camera gain to pick up sensitive images, a high-image resolution measured in the number of lines per frame, the minimum light conditions the camera works under, the ability to control the camera iris manually or automatically, and whether the camera can automatically adjust to a white balance.

Broadly, the decision comes down to choosing between a three-chip charge-coupled device (CCD) camera and a one-chip CCD camera.

A three-chip camera will allow the viewer to see all the colors of the rainbow as well as distinguish the gradation between colors. With a one-chip camera, the viewer will see fewer colors and they will run together.

More pragmatically, one-chip camera resolution will be adequate for videoconferences among people. A three-chip camera will be necessary when a customer wants to zoom in on blueprints spread across a document stand.

Despite resolution, the extent to which the camera can be directed from the system controller is probably the most important consideration.

Until recently, for example, Sony Corp. three-chip cameras could not be controlled by the codec controller, but the company developed an RS-232 port interface to facilitate such control.

This advance is significant because the awkwardness of setup and control — not to mention price — was the main drawback to using a three-chip camera for text transmittal.

Of course, the companion issue to cameras is the monitor. Selecting a monitor revolves around how many people are going to view the picture and how far away from the monitor they will sit.

The rule of thumb for figuring out how large the monitor should be is to make sure the viewing distance is seven times as large as the monitor's vertical height. Thus, a monitor with a 20-in. picture height can be seen by people sitting 12 feet away.

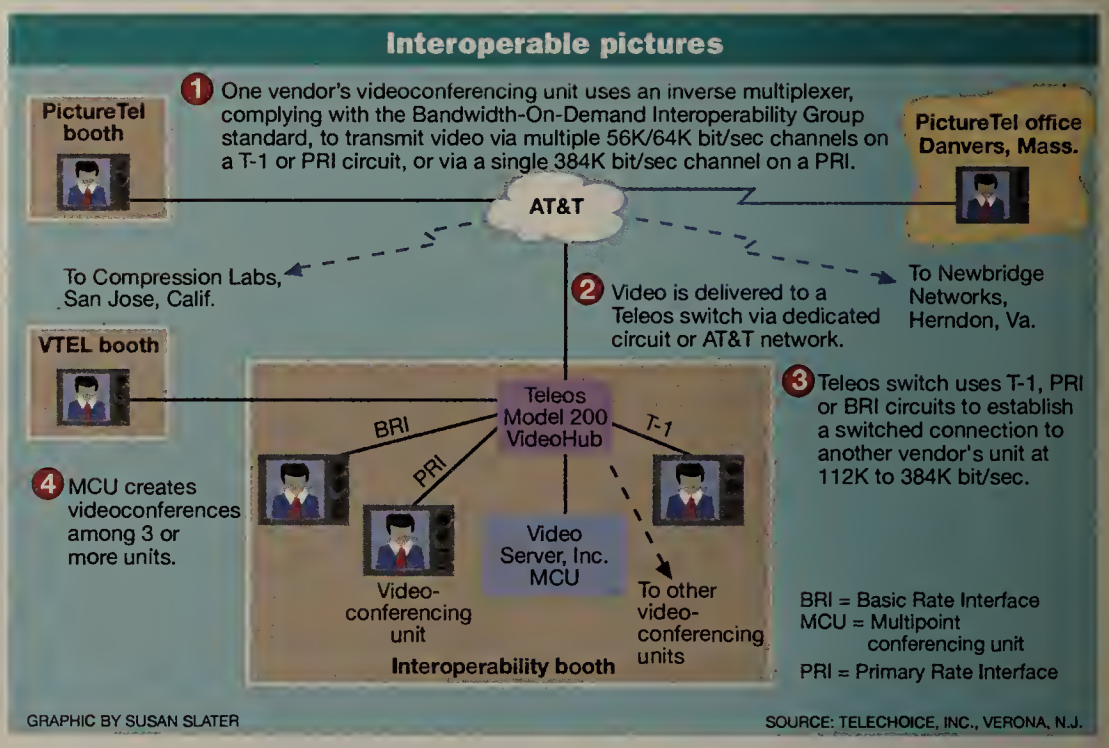
new applications.

As Integrated Services Digital Network services become more widely available or international videoconferencing becomes a requirement, customers may move from switched 56K bit/sec services to ISDN.

Before the echo canceler transmits outgoing signals, it checks them for possible echoes of the received incoming signals. If it detects any similarities, it deletes these portions of the signal from the outgoing signal.

Users should consider future needs carefully before settling on a system constrained to running at 112K bit/sec. In the long run, the cost of upgrading bandwidth-limited systems may be greater than buying flexible systems in the first place.

Users may also want to upgrade a codec to support certain features for new application needs. Whether such features require a hardware or software upgrade depends on the existing capabilities — the processing power and memory capacity — of the base system.



Getting the picture

Because the videoconferencing industry lacks a sanctioned interoperability testing group, vendors have taken it upon themselves to prove that certain products work together.

For instance, the largest showing to date of interoperability among virtually all major videoconferencing vendors and carriers was held during the International Teleconferencing Association's annual trade show last June (see graphic, this page).

At the show, vendors used Telecommunication Standardization Sector's H.261 standard to forge links among disparate videoconferencing systems installed in a special interoperability booth, as well as in specific vendors' booths and at vendors' remote offices. The coder/decoder of every videoconferencing system in the demonstration was connected (either directly or via AT&T switched digital services) to a Teleos Communications, Inc. Model 200 VideoHub switch, which established sessions among videoconferencing units at 112K to 384K bit/sec.

For the most part, codecs used various vendors' inverse multiplexers to transmit multiple 56K/64K bit/sec channels over a T-1 or Integrated Services Digital Network Primary Rate Interface (PRI), or a single 384K bit/sec channel over a PRI circuit to the VideoHub. One vendor — Hitachi America, Ltd. — used an ISDN Basic Rate Interface circuit to link its videoconferencing system to the VideoHub.

Each videoconferencing unit was also attached via the VideoHub to a Video Server, Inc. multipoint conferencing unit, which established multipoint videoconferences.

Such national interoperability testing is being supplemented by international testing conducted at such forums as the Harmonization of Advanced Telecommunications trials and the European Teleconferencing Association-sponsored trial, held recently in Utrecht, the Netherlands.

Large systems integrators, such as Philadelphia-based Peirce-Phelps, Inc., also conduct codec interoperability tests in their laboratories and among their clients.

In addition, some interexchange carriers have set up laboratory testing environments in which codecs from various manufacturers are tested in a variety of configurations. Sprint Corp.'s Video Group provides a document outlining the specific parameters that equipment must be set to in order for it to interoperate with other equipment through Sprint's services.

Until recently, there has not been a means to test adherence to the H.320 standards, but Horsham, Pa.-based Delta Information Systems, Inc. now markets a testing device that verifies a codec's compliance with the range of H.320 standards.

BY VANYA GALANIN

"Monitor and camera technology is not moving that fast," says MASTA's Mullins. "Boardroom monitors will not need to be replaced to keep up with frequent technology advances as codecs do. It does not make any sense to skimp here."

SYSTEM UPGRADABILITY

In the quickly changing videoconferencing industry, obsolescence is a fact of life. So users are always looking to upgrade their equipment to support the latest technology.

For instance, customers buying systems with proprietary codecs will probably want to add standards-based technology as it becomes available. Users may also want to upgrade from a low-speed videoconferencing unit to a high-speed one.

"You do not want to be locked into a low-bandwidth system if you may grow later," says S. Ann Earon, president of Telemanagement Resources International, Inc., a videoconferencing consultant in Lake Wylie, S.C. "A more fully featured system will afford you greater flexibility."

The decision to upgrade the transmission media capability may be made in response to lower switched service prices, the availability of unused leased-line capacity or to facilitate

Participating vendors

Room system videoconferencing vendors:

- BT North America, Inc.
- Compression Labs, Inc.
- Datapoint Corp.
- GPT Video Systems
- Hitachi America, Ltd. Telecommunications Division
- Mitsubishi Electronics America, Inc.
- NEC America, Inc.
- PictureTel Corp.
- VTEL Corp.

Inverse multiplexer vendors:

- Ascend Communications, Inc.
- Newbridge Networks, Inc.
- Promptus Communications, Inc.
- Teleos Communications, Inc.
- Tylink Corp.

For example, on some systems, features such as picture-in-picture and still-graphics will require additional hardware drivers and memory. Other capabilities that companies will want to upgrade will simply require new software commands, such as simpler user interfaces and speed dialing.

While it is clear that software upgrades come easier for end users than do hardware upgrades, the real question should not be hardware vs. software, but what the outcome of the

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Video enhancements

Taking one step forward and two steps back summarizes the state of videoconferencing for 100 readers recently interviewed in a *Network World*/Focus Data, Inc. survey.

While lauding strides vendors made to improve videoconferencing standards, interoperability and worldwide distribution, many users still feel hamstrung by fundamental issues such as ease of use and system reliability.

"The ease of use has got to be improved," says one user. "We have practice sessions but it seems there are always glitches during a live videoconference."

In addition to ease of use, survey respondents cite conformance to standards and throughput/performance as the top criteria they use when selecting a videoconferencing system. (see graphic, this page).

"Throughput is key," one user says. "We cannot afford to lose continuity of the meeting due to blurring images. The video quality needs to be better. The delays hurt the interaction. We want good picture quality with the lowest bandwidth possible."

Other key concerns include difficulty establishing connections, as well as poor sound and picture quality. Users also want improvements in compression algorithms, speed and bandwidth.

"We make professional presentations all the time, so the presentation is everything," one user says. "The product must perform without failure at all times so that we don't risk embarrassment."

On-site service as part of the warranty and next-day availablity of parts are the most critical service and support issues, according to users surveyed.

The readers surveyed use — or plan to use — a total of 439 room videoconferencing systems and 340 rollabout systems. Currently, 31% of those surveyed have a multipoint conferencing unit (MCU) that establishes multipoint videoconferences, while 34% plan to buy an MCU within the next 12 months.

The majority of respondents, 77%, say they use their systems to hold videoconferences among sites in their own organizations. But the survey shows 23% of respondents are beginning to hold videoconferences with other organizations.

Videoconferencing selection criteria
Based on highest possible score of 10

Criterion	Importance rating	Satisfaction rating
Conformance to standards	8.7	7.5
Ease of use	8.6	7.4
Throughput/ performance	8.3	7.3
High frame-per-second rate	8.2	7.2
Price	8.1	7.0
Interoperability with multipoint conferencing units	8.0	7.0
Support for external devices and file formats	8.0	6.6
Number/type of cameras, monitors and microphones supported	7.6	7.0
Standard bus architecture	7.5	7.0

SOURCE: FOCUS DATA, INC., FRAMINGHAM, MASS.

The highest price users are willing to pay for a rollabout videoconferencing system is $33,000. For a room videoconferencing unit, readers are prepared to pay as much as $54,000.

BY BARBARA WIERZBICKI

Focus Data, Inc., a market research firm based in Framingham, Mass., gathers data from end users to determine network and information systems usage, needs and trends. For more information, call Mona Dabbon at (508) 626-2556.

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upgrade will be and how much it will cost.

For example, it may be possible to upgrade from higher bandwidth audio to lower bandwidth audio by implementing a new software algorithm. But without added processing power, the sound may not be great.

Even the best technology will be worthless if it cannot be used easily. Videoconferencing units are making it out to the uninitiated.

As an example, Kinko's Service Corp. will be putting videoconferencing units into more than 600 retail outlets that provide such business services as copying, printing, faxing and computer rentals. Because employees in each store are not well-schooled in networking technology, the company's decision shows the extent to which videoconferencing is coming to the masses and the need for user friendliness.

One factor that contributes significantly to ease of use is automatic capability exchange, which makes it very easy for anyone to set up a videoconferencing call. All the caller has to do is dial the desired party, and the system figures out the video and communications profile of the other party's system. This capability, which is particularly useful for organizations that plan to do interfirm and international video calling, is offered by BT North America, CLI, PictureTel and others.

Screen-based prompts are also high on the list of user-friendly items. These assist users with everything from explaining the controls — which may be color-coordinated with the desktop control functions — and dialing video calls to troubleshooting the system. These prompts can show up on the user's screen or on a far-end device for remote troubleshooting.

Another useful feature is far-end camera control, which allows users to manipulate the camera on the other end of the conference. This is a standard feature of BT North America's VC5000 Series Rollabouts, CLI's Rembrandt II/VP, Mitsubishi's Series MVC-8100, NEC VisuaLink 5000 NETEC Series Video Codec rollabout systems, all VTEL systems and PictureTel's System 1000 and System 4000.

FUTURE CODEC DIRECTIONS

The price/performance of videoconferencing systems has improved dramatically during the past five years, largely on the basis of ever-clever compression algorithms that make videoconferencing possible at rates as low as 112K bit/sec.

But advancements in compression technology are topping out. There is general consensus that the Discrete Cosign Transform compression method used by most of today's codecs has reached its functional limitation. This means that future improvements in compression will be on the order of 20% to 30% over previous algorithms rather than the 200% to 300% gains made in years past.

Radical improvements in video compression will only be made when the algorithms have so-called image understanding, or the ability to recognize a nose as a nose and use this recognition together with the knowledge of a nose's behavior in transmitting information about it.

But with bandwidth becoming less expensive and more readily available, further advances in compression technology may be unnecessary.

In the near future, much of the improvement in codec technology will come in the way of lower costs. Spurred by the advent of standards and the potential of ubiquitous desktop videoconferencing, codec manufacturers are teaming up with chip makers to lower the cost of the codec technology from tens of thousands of dollars to hundreds of dollars.

Unlike the high-powered general-purpose processors that workstation manufacturers are employing today, future chipsets will be designed to meet the specific demands of video.

Cost improvements will also come from the economies of scale that desktop video is expected to drive.

Video production is still at fairly new technology levels, with manufacturers measuring their sales in the thousands, not hundreds of thousands or millions.

All in all, videoconferencing joins the ranks of technology incumbents that have passed the gadget stage and become a truly strategic part of many corporations' modus operandi. End users with videoconferencing needs should be actively working on a plan to fit video into their 1994 budgets, if it was not already part of 1993's budget.

Finn is a senior analyst with TeleChoice, Inc., a Verona, N.J.-based consultancy specializing in strategic planning and analysis of intelligent networks, services and applications, and coauthor of the forthcoming book *A Buyer's Guide to Videoconferencing Systems and Services* being published by Artech/Horizon House. He can be reached at (201) 239-0700, via MCI Mail at 445-4690 or the Internet at dbriere@mcimail.com.

Galanin, a former TeleChoice associate, is currently an MBA student at Carnegie Mellon University in Pittsburgh and can be reached via the Internet at ag48+andrew.cmu.edu.

Help desk

Continued from page 2

Daniel Blum, a principal with Rapport Communication in Takoma Park, Md., responds:

There are no direct cc:Mail-to-WordPerfect Office gateways, so you will need to evaluate Message Handling System (MHS) gateways, Simple Mail Transfer Protocol (SMTP)-based gateways and X.400 gateways. Both WordPerfect and cc:Mail, in conjunction with third parties, support all three solutions. At this time, no vendor solution offers transparent interconnection.

A NetWare MHS gateway can be deployed with a NetWare Global Messaging (NGM) server if you already run a NetWare network. But while the WordPerfect Office MHS Gateway 4.0 for DOS supports Novell's Standard Message Format (SMF) Version 71, cc:Mail's MHSLink gateway only supports SMF 64, limiting you to one recipient and one attachment per message.

Thus, large messages going from one environment will get split up, causing some confusion when users generate replies, forward copies and file messages in folders at various stages. There are also address size limitations with SMF 64 that are done away with in SMF 71.

For an SMTP gateway, WordPerfect Office MHS Gateway 4.0 for DOS can be collocated with the WordPerfect Office message server; it requires Novell's LAN Workplace for DOS Version 4.1 and the Transmission Control Protocol/Internet Protocol transport system software. CC:Mail's Link to SMTP must run on a dedicated DOS system separate from the cc:Mail router.

Although cc:Mail has announced plans to release a Link-to-X.400 product that will run on its router machine, X.400 solutions for WordPerfect and cc:Mail are only available from third parties.

For product information, contact cc:Mail at (800) 448-2500, WordPerfect Corp. at (800) 321-4566, or WordPerfect Office Technical Support at (800) 321-3253 or (801) 226-4440.

I'm looking for Government Open Systems Interconnection Profile- or Portable Operating System Interface-compatible software that would let me display a window that is open on a remote user's workstation and guide that user through the application.

Mike Wills, Los Angeles

Doug Shaker, vice president of support and training for Qualix Group, Inc., a San Mateo, Calif., company that sells and supports a wide variety of software for client/server workstations replies:

There are several software products you could investigate. One is Hewlett-Packard Co.'s SharedX for the HP9000 series, which allows one user to start an application and display it on multiple X servers. Only one user at a time can have an active mouse and keyboard, but that control can be passed from one server to another. Only the central application server needs to be licensed. SharedX has no shared voice channel, so users must share verbal comments over the phone.

SharedX costs $520 per license. For product information, call HP at (800) 637-7740.

Another package, Communique from InSoft, Inc., is available for multiple platforms and allows snapshots of applications to be shared between the connected displays. Live applications between the devices are not presently supported, but InSoft says it will add such a capability by year end. Communique also allows the sharing of voice input and live video images. It costs $995 per user. For more information, call InSoft at (717) 730-9501.

A third option, ShowMe from SunSolutions, Inc., is available for SPARCstations. It allows snapshots of applications to be shared between X servers. ShowMe, however, only supports application snapshots between nodes. It costs $319 per user or $999 for 10 users. For more information, call SunSolutions at (800) 873-7869.

A final option is XMX, freeware that allows an application to be shared among multiple X servers, but cursor and keyboard controls can never be moved from the host that started the application. XMX can be obtained via anonymous FTP from wilma.cs.brown.edu as /pub/xmx.tar.Z.

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Going Further Staying Closer™

An enterprising idea

BY JOANNE CUMMINGS

It's every network manager's holy grail.

Everyone strives to design their enterprise networks so end users can access critical information no matter where it's located, massage that data, print reports, message coworkers, and be confident that files are backed up properly and the entire process is secure.

It's a noble quest for sure, and one in which local-area networks are increasingly playing a central role. Lured by the promise of huge cost savings, faster development times and productivity enhancing LAN-based applications, many network managers are linking their departmental LANs into enterprise networks to foster greater cooperation among business units.

But as they undertake this mission, network managers often find they are venturing into unchartered territory in an effort to provide central services to LAN users across the enterprise.

Although their methods may differ, most users who've undertaken the task of growing their LANs into enterprise nets agree that the key to success is to centralize core services, such as electronic mail, directory services, network management, security and backup. But users warn that the primary impediment to that strategy is not technical; it's the ability to acquire an enterprise vision.

"In a lot of places, LANs grow out of the departments," says Bill Harrison, director of networking at the Dana Farber Cancer Institute in Boston. "When they decide to have the LANs support the entire enterprise, they move directly from that departmentalized architecture without really thinking about the consequences." Dana Farber developed its network from the beginning as an enterprise resource, so all the departments have access to the information they need from virtually any desktop in the enterprise, Harrison says. "We took the needs of the departments into consideration, but we also had to look at the big picture," he adds.

Top choices for enterprise LAN standards

Management	SNMP
Network operating system	Novell, Inc.'s NetWare 4.0
Protocol	TCP/IP

Users should focus on these 3 standard platforms to provide the greatest level of interoperability across the enterprise.

SOURCE: MARK FREUND, CHELMSFORD, MASS.

Gaining that enterprise perspective when coming from a departmentalized LAN background is a difficult endeavor. Several factors play a role, including developing standards that allow for the advent of new technologies and finding the right blend of systems integration and political savvy to pull it off. But perhaps the most deciding factor is planning.

"When the downsizing projects fail, people tend to blame the LANs, rather than the planning that went on and the implementation," Harrison says. "They think it's different than what went on in the mainframe environment, and it's really not. They need to apply the same methodology."

Users make this mistake because LAN technology, in comparison with a mainframe, for example, is deceptively simple. "I can train anybody to go out and hook up a Novell network," says David Soll, vice president of advanced technology at Omicron, a Philadelphia consultancy. "It's not that difficult. But to build an enterprise LAN platform that's economical and provides good performance requires a lot more than just technical talent. It requires good management sense, good planning and a good implementation."

Many users don't realize the time investment required. "Most companies don't allot enough time and resources for thorough planning," Soll says. "Just the initial setting of requirements and standards for moving to a LAN-based enterprise network takes anywhere from three to six months, and the entire migration can take up to five years. This isn't something you do overnight."

A large part of the planning process entails setting corporatewide standards, Soll says. "A lot of LANs grew out of small departments and, as a result, you have an enterprise with a whole bunch of different network operating systems

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Companies seek to forge enterprise nets from their independent LANs but must clear technical, political hurdles.

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(NOS), different E-mail systems and so on. But you can't interconnect everybody without some kind of centralized standards and guidelines, so that's really the first step."

STANDARDS BY COMMITTEE

The best bet to ensure standards adoption across the company is to build a centralized committee comprising representatives from the various departments. "We had been fairly decentralized, with the information technology function in each separate department," says Dave Burrough, open systems implementation manager at Weyerhaeuser Co. in Tacoma, Wash. "When it came to setting standards for our LAN implementation, we set up cross-functional teams to take on each standard."

The teams consist of representatives from various departments — both IT and the user community — who do the evaluations and make recommendations, Burrough says. "We try to get the users involved, gain as much consensus as possible and set the result as a standard," he says. "It's the only way to do it."

Flexibility is key. "You can't be very rigid in making your standards," says Valerie DeRusso, director of network services at Omicron. "When you get down to it, you can't actually tell a corporation of 10,000 people that they can only use one product because there are different needs in that group of 10,000. You have to decide what can be rigid and what can be broad."

Most companies also incorporate an exceptions process. For instance, Burrough says, if end users locate software that meets their unique needs but does not fall within the corporate standards policy, the committee rules on its usage. "You have to be flexible. Your standards can't overshadow the real reason for the network, which is to support the business."

Analysts agreed. "You have to look at this new LAN platform from an end user's vantage point — what makes the network desirable," Soll says. And that, he says, is often performance, reliability and functionality. "Issuing edicts doesn't help," he adds.

LAN CENTRAL

Once standards are in place, users need to begin establishing network services. "The best approach is to centralize services, like your print services and the ability for you to acquire data from different platforms," DeRusso says. "Once you do that, security and network management follow a little easier."

Mark Freund, Sun Networks, the systems integration unit of Sun Microsystems, Inc. in Chelmsford, Mass., agrees. "You need cooperation between the end-user group and the central IT group," he says. "But somebody's got to manage this from an enterprise perspective. You have to manage things like global naming issues, version control, software distribution, security and bandwidth requirements. You need a centralized point of control."

Security and backup, for example, are best handled by the central IT group. "We've even centralized all of our servers in one computer room," says Randy Aldrich, PC technical support supervisor at Federal Kemper Insurance Co. in Decatur, Ill. "We did so for physical security and also so they would be environmentally protected. When critical data is out on the LAN, it needs to be properly protected."

The IT group handles daily server backups at Federal Kemper, although users are responsible for backing up data on their individual PCs. "Our philosophy is if you have data worth being backed up, it's data worth being on a server," Aldrich says. "But we do provide people with procedures to back up their machines to the network."

The same holds true at Dana Farber. "Our servers are all centrally located and managed centrally, just like in a mainframe environment," Harrison says. "The applications the network supports are all on the servers and backed up and stored off-site. End users are responsible for their own [PC] backups, however."

Print services is another area where centralized control is necessary. "We control who can print to what printer," Aldrich says. "When a person logs on to the network, they are assigned to a printer. If their printer experiences problems, we'll temporarily reassign them to another printer elsewhere that's fairly close to them. But that's all controlled centrally."

Analysts concur. "You have to establish an entire print strategy that determines how you get to the different protocols and platforms in your enterprise," DeRusso says. "What you want to be able to do is have users log in anywhere in the entire corporation and print to the printer closest to them, not just the one at their own desk. And that requires some kind of centralized control."

She says some off-the-shelf software enables users to print to different platforms; however, none of those packages can handle the task completely for every user. "There are lots of off-the-shelf solutions, but all of them require some integration," she says. "That's really the bottom line."

"Basically, you either have to find a really good systems integrator or you have to become one yourself," says Kathryn Hanford, director of global voice and data communications at Reebok International, Inc. in Stoughton, Mass. "And systems integrators aren't that easy to find, and neither are internal resources."

LOST IN THE MAIL

Perhaps the biggest hurdle for establishing centralized control of network services in a LAN-based environment is E-mail.

"We support four or five different E-mail systems, but it doesn't do much good to have five different systems if you can't talk to the guy next to you," Dana Farber's Harrison says. "So we said that every mail system needed to support the [Simple Mail Transfer Protocol], and then we centrally manage the gateways."

Omicron's Soll says the smart way to integrate disparate departmental E-mail systems is to set a messaging standard, such as Message Handling System (MHS) or SMTP, on the corporate backbone and specify that departmental mail systems support that standard. The E-mail systems can then be linked pretty efficiently by gateways. "In order to make [the enterprise platform] economical, you can't just throw away millions of dollars in hardware and start all over," he says. "You have to take into account the legacy systems and make them work with everything else."

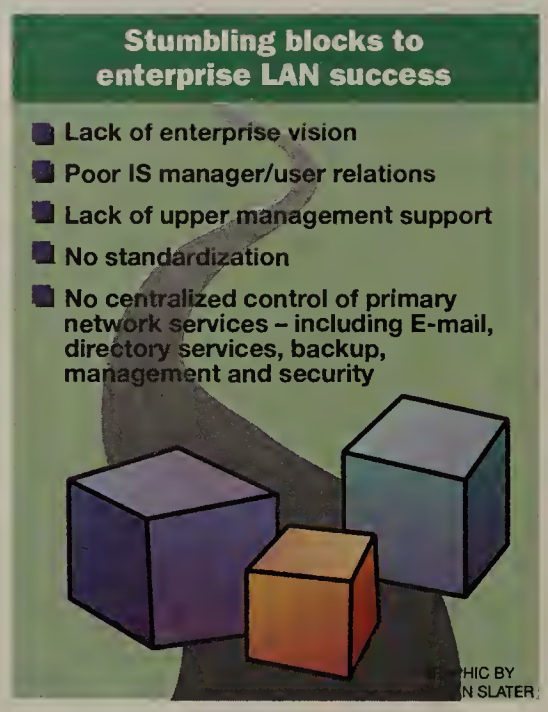
But the problem of communicating between disparate E-mail systems increases exponentially when there is no central control. One of Soll's clients moved from a mainframe environment, where the only mail package available was IBM's host-based Professional Office System, to a LAN environment with a hodgepodge of Da Vinci Systems Corp.'s Da Vinci eMail, Lotus Development Corp.'s cc:Mail, Digital Equipment Corp.'s All-In-1 Mail and Microsoft Mail. Because they have no centralized control, "If somebody gets married and wants their name changed in their E-mail, it takes about 15 phone calls and three weeks to get all the directories synchronized to handle that," he says.

GETTING IN SYNC

Directory synchronization is a problem for Dana Farber's Harrison, as well. "We have one primary database that acts as a white pages, which we have to almost manually distribute," he says. "We haven't found a really good directory service that can handle the different systems we have in place efficiently."

As a result, Dana Farber has developed its own directory service. "We have a central server that acts as a white pages directory. We manually set up a database of everybody, and then it does distribution to the preferred mail address. That gives us central control."

The next issue Harrison is tackling is to expand E-mail and directory services to the Longwood Medical Area, a loose affiliation of about five large Boston area hospitals.



"We're working on a centralized directory service for all of the Harvard affiliates and hospitals here," he says. "It's very important because most of the doctors work in multiple locations." The next step, he says, is to bring the network services to business partners outside the current network reach.

Extending enterprise net services outside the corporate LAN internet must be taken into consideration when setting standards and implementing the network strategy, Sun's Freund says. "I think increasingly the enterprise network will extend beyond the LAN internet and across other private networks," he says. "And if you think of it that way, the planning and implementation of the overall LAN internet architecture become even more critical."

INTEROPERABILITY

To deal with the problem, focus on setting standards in three primary areas, Freund says — the NOS, the network protocol and the network management system.

"To really achieve interoperability, you have to look at a couple of critical areas for LAN integration," he says. The NOS is a crucial choice because it can support different applications as well as the different operating systems on the desktop, like Macintosh, PC and Unix systems.

The network protocol is another option. At the lower level of the infrastructure, it's going to provide users the best interoperability to the most types of devices, from mainframes to PCs.

Users concur. "We're pretty good at accomplishing universal connectivity from our LANs," Dana Farber's Harrison says. "From almost any desktop, you can get to the VAX systems, you can get to AS/400 systems, and you can get to mainframe systems. And we were able to do that by standardizing on Banyan [Systems, Inc.'s] VINES and using TCP as the standard protocol on everything, including the Macintoshes. It was the one way to ensure interoperability."

The final piece for promoting interoperability is the network management platform, Freund says.

"If you think about it, every single vendor of a network component — from hub vendors to NOS console makers — have their own products to manage their own components," he says. "Users then need to find a central net management platform that provides an interoperability engine for those various products."

The most popular technology to fill that role today is the Simple Network Management Protocol.

"If you make that decision [and choose to standardize on SNMP], you'll have the biggest pick of network management third-party applications out there," Freund says.

Users agree that standardizing in a few key areas and working from there is the best route to a successful enterprise LAN implementation. But once the standard is agreed upon, getting the enterprise to fully adopt it is a slow, cumbersome project.

"We only make changes when business needs generate it," Weyerhaeuser's Burrough says. "We have a strategic direction of where we want to get to and what we need to do in the interim to get to that end state."

Although Reebok had standardized on Novell, Inc. NetWare and Ethernet as its enterprise LAN platform, it just recently swapped out the corporation's last VINES network. "We just do things as we go along," Reebok's Hanford says. "We change out every piece that isn't standard but only when there's a business reason for it."

LOOKING TO TOMORROW

Perhaps the biggest mistake users make when looking to adopt LANs as their enterprise network platform is not accommodating future technologies.

"The big failure companies make is they think the way to solve this is to fix it today for today's problems and with today's technologies," Freund says. "That is not the way to do it because you'll never get ahead of the game at that rate. You'll always be reacting to the next technology that comes along."

Users agree. "You can't plan to be using 10M bit/sec Ethernet 10 years down the road," Burrough says. "With [Asynchronous Transfer Mode] on the horizon, you have to make sure you can accommodate that, as well as any other new technology."

Cummings is a free-lance writer in Marlborough, Mass.

Letters

Continued from page 39

First of all, let me say that I am all for a certification program for network support professionals. It has been my experience that anyone who can spell network, or who can recite the Open Systems Interconnection stack, feels that they are a networking expert. I do, however, have a problem with this particular certification program.

My first complaint is the way the categories are set up. In the particular shop I work in now, we handle predominantly Systems Network Architecture and Transmission Control Protocol/Internet Protocol network traffic. My initial response to this certification process is that I need to sidetrack myself and become familiar with Novell, Inc.'s NetWare to get the Technical Systems Engineer certification. Then, once I attain that, I must have five years of experience to even try to get the certification in the area that I have been working in for years.

My second complaint is with the time frame. While I agree that a certification process is desirable, I do not believe that this one fits the bill. With technologies changing as fast as they are, and based on the way that these levels are set up, I don't see anyone becoming a Master Systems Engineer, for example.

Who do you know that has five years of experience with Asynchronous Transfer Mode? Yet, I know multiple people who I would consider Master Systems Engineers and Senior Systems Master Engineers.

I do believe that testing and certification is important, but let's not dwell on just the old technologies or vendor-specific certifications.

Let's come up with a vendor-neutral certification process with time frames reasonable to accommodate the new technologies.

Mike McIver
Network support specialist
Arizona Department of Health Services
Phoenix

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Have you seen an article in *Network World* with which you strongly disagree or heartily concur? If so, send us your thoughts in a letter to the editor.

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Question authority

Thanks for your consistently high-quality coverage of issues facing network professionals.

I don't know about your other readers, but when I see an issue (Sept. 20) that's loaded with photos of Al and Hillary (where was Bill?), I get a little nervous.

The idea of the U.S. government's increasing control over more aspects of our lives — computing, networking and private industry — is a bit unsettling to me.

Lynne Gregg
Independent consultant
Seattle

Happy winner

We are especially proud of the honors we received from your readers as winners of the Enterprise Technology Awards in the LAN server and superserver categories. Awards like these are significant because they recognize those companies leading the way to the next generation of client/server and distributed applications.

Even more important, these awards are based on the experience and insight of *Network World* readers — those who use these products.

We at Compaq Computer Corp., and the rest of the industry, look to *NW* for timely reports on trends and products in networking. These awards are a reflection of the value you bring to users and suppliers of networking products. We would like to thank *NW* readers for honoring Compaq and assure them that we will continue to strive for excellence in server products.

Gary Stimac
Senior vice president and general manager
Systems Division
Compaq Computer
Houston

Attention vendors

Network World invites you to participate in product surveys for upcoming Buyer's Guides. These Buyer's Guides will examine the critical selection criteria and current market trends that influence the purchase of various products and services.

For more information on the Buyer's Guides listed below, call Jim Brown, managing editor of features, or Barbara Wierzbicki, Buyer's Guide editor, at (800) 622-1108.

Contacting us early in the process will help us determine the focus of the Buyer's Guide and compile the list of vendors that should participate in the survey.

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Switched Multimegabit Data Services	Nov. 29
Imaging	Dec. 6
Packet switches	Dec. 20
Electronic software distribution & licensing	Jan. 10
Voice messaging	Jan. 24
Frame relay services	Feb. 7
LAN backup systems	Feb. 14
Electronic mail	Feb. 28
Virtual networks	March 14
100M bit/sec options	March 21

Viva Las Vegas?

I share your concern about moving INTEROP from San Francisco to Las Vegas (Sept. 6, page 32) — and from Washington, D.C. to Atlanta, too. My wife says, "There's a lot of stuff to do in San Francisco and Washington. What's a family to do in Las Vegas and Atlanta?"

And, some of the vendors have clearly been at INTEROP Fall because the Bay Area techies will come. But if the techies don't come, and, therefore, the vendors don't come, I won't go.

Russell Nelson
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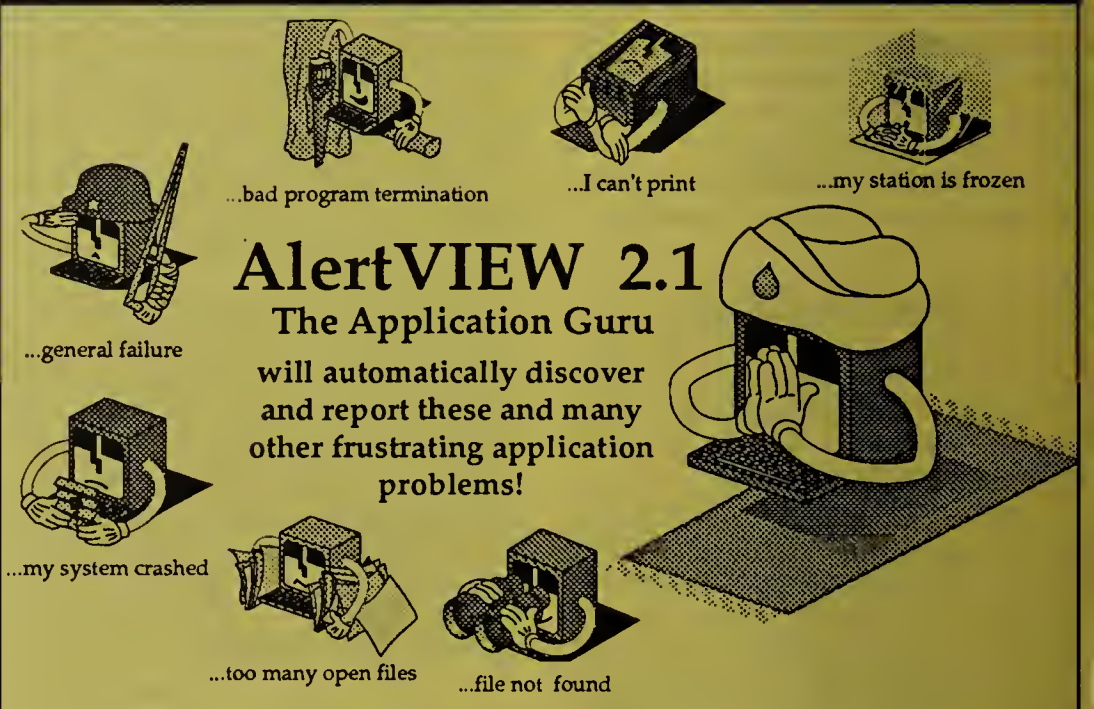

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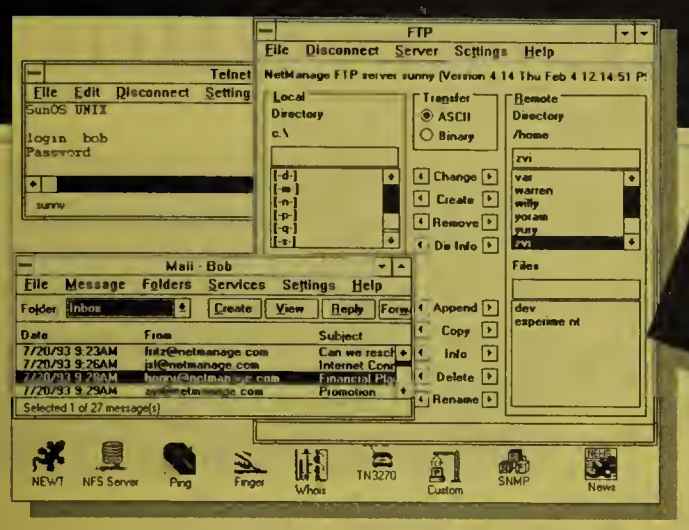

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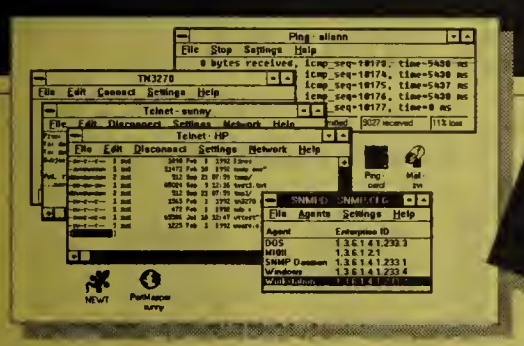

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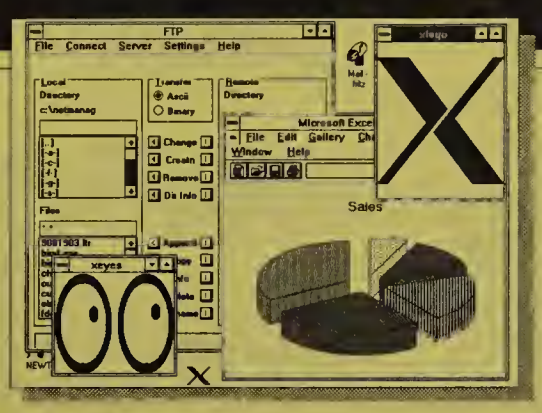

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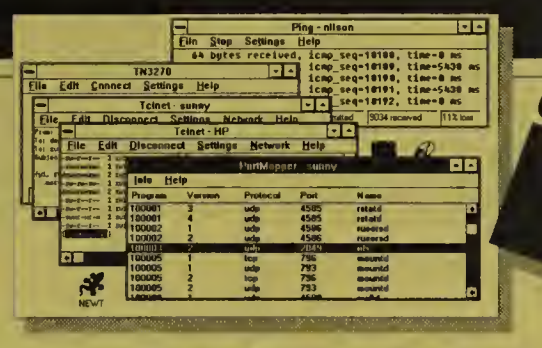

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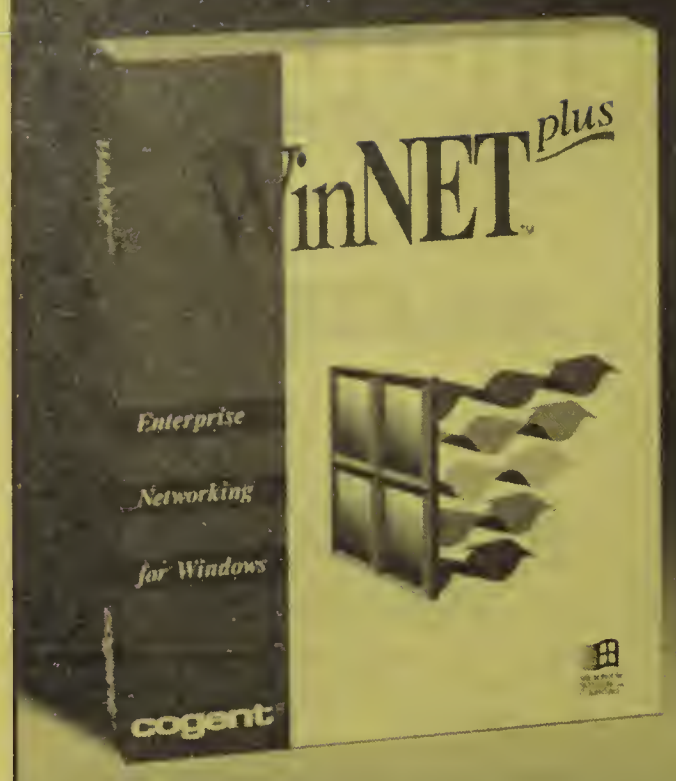

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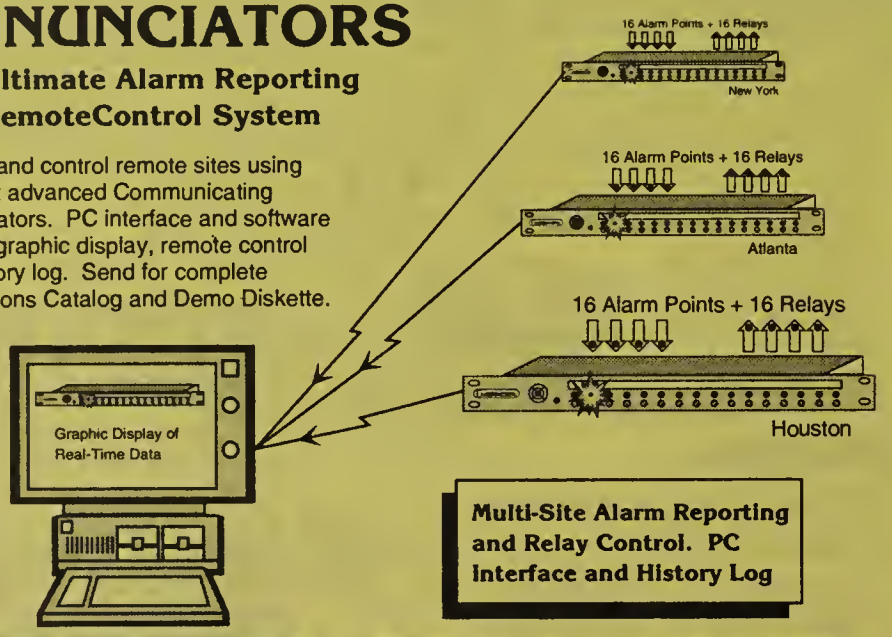

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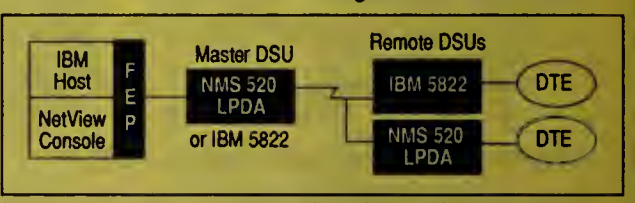

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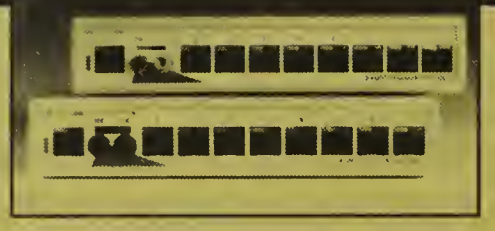

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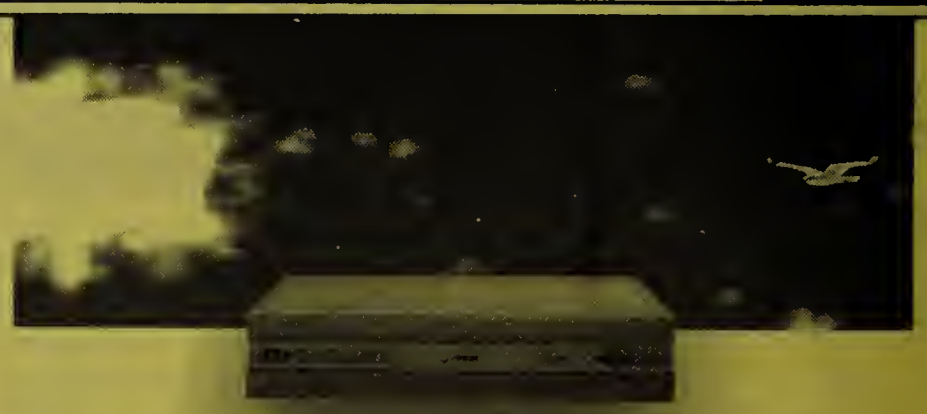

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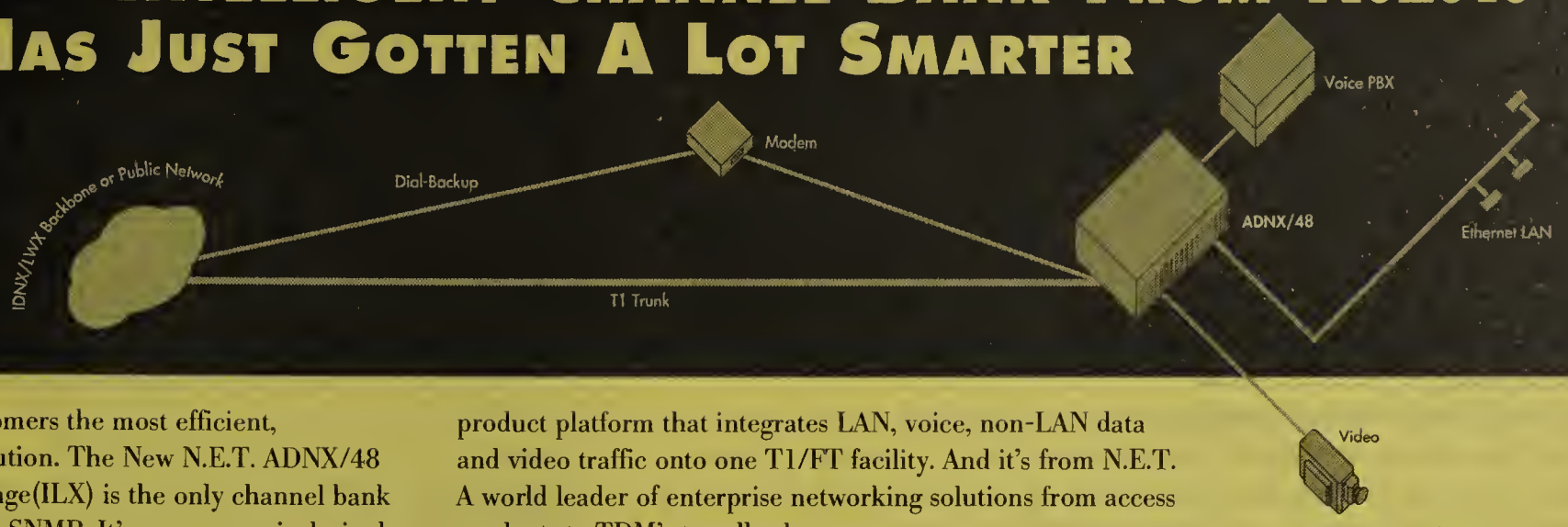

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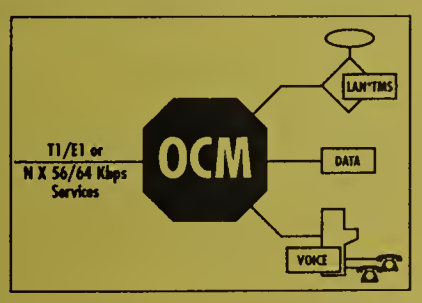

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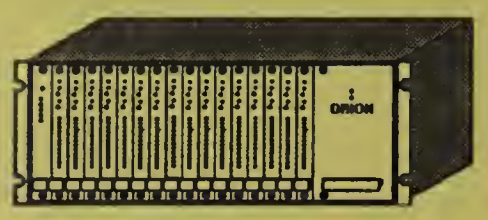

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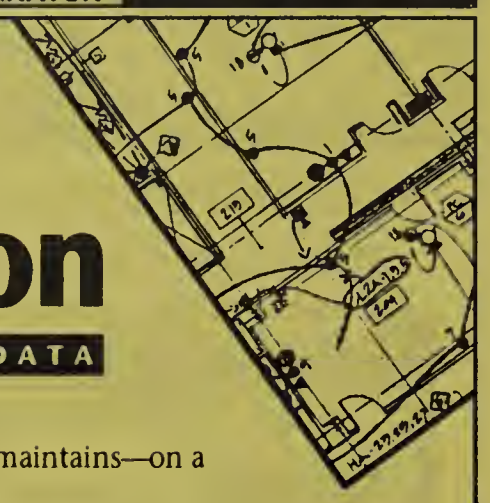

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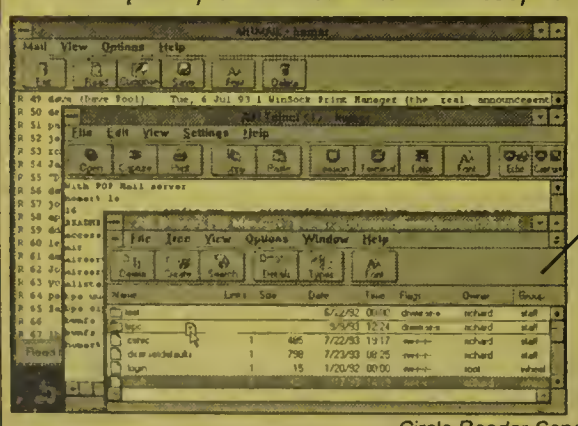

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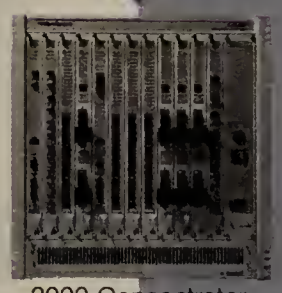

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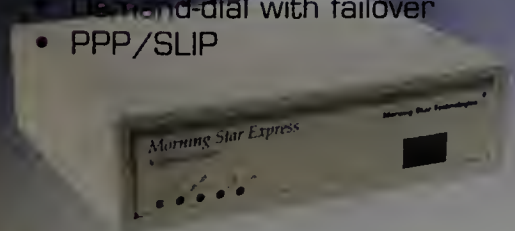

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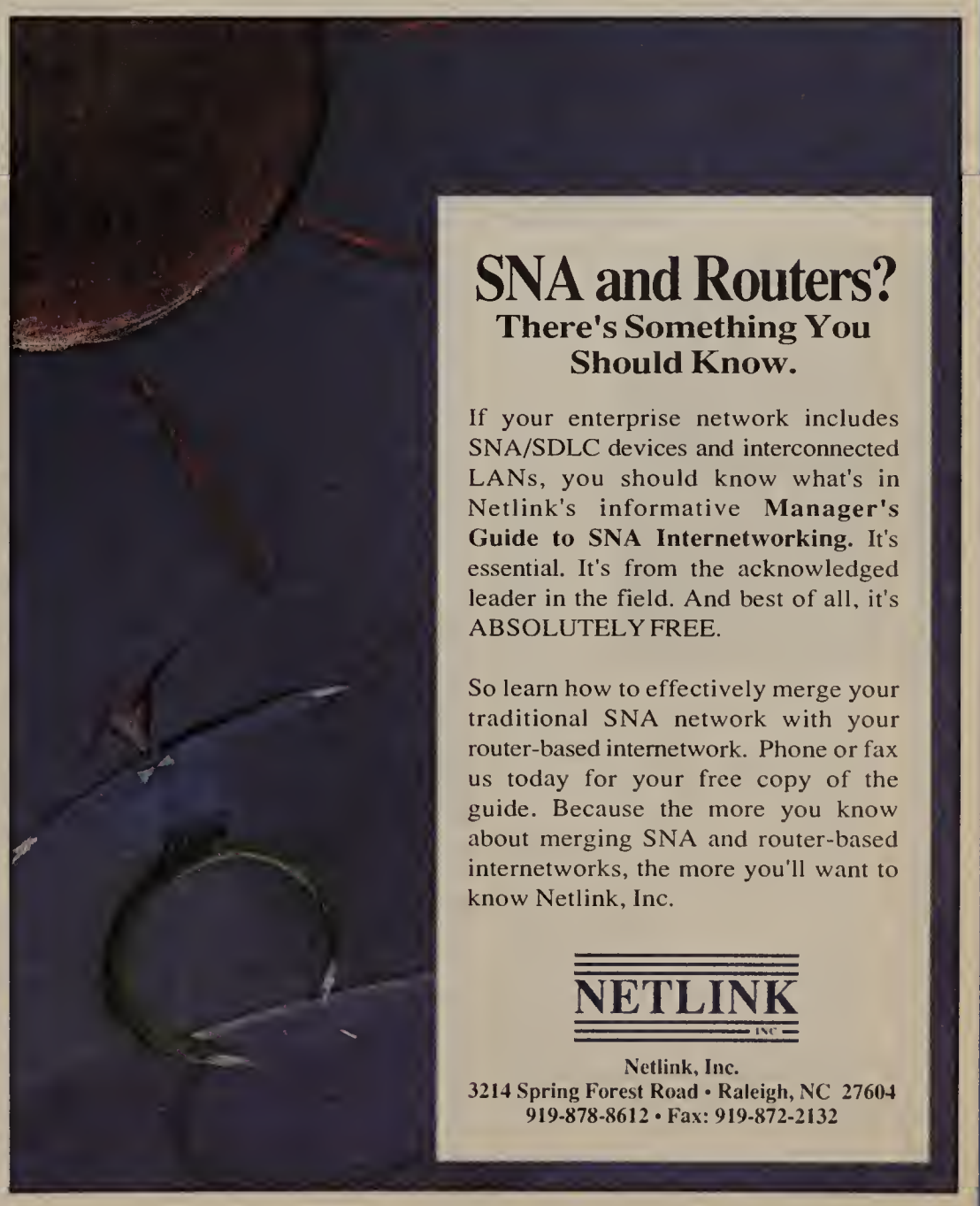

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Networking Careers

Rift

Continued from page 1

cia Seybold Group in Boston, said OMG and Microsoft have about six months to work out a compromise. By March, Microsoft will have finalized most of the decisions regarding Cairo's architecture, and OMG will be midway through the process of hammering out a specification for the next version of CORBA, the cornerstone of OMG's architecture.

CORBA 2.0 will specify a standard mechanism by which multivendor object request brokers (ORB) will interact, as well as a distributed repository that stores information about objects on the network.

These components are critical if users are going to exploit the power of objects to integrate applications and processes across multivendor distributed environments.

"If Microsoft and OMG can't reach an agreement by March, then it's 99% certain the two will make architectural choices that will be difficult to reconcile," Rymer said.

THE LAST BEST CHANCE

The last best chance for the two sides to harmonize their differences lies in a request for proposal that OMG will issue in December for object linking and embedding (OLE) services.

Rymer said OMG pushed up the date for the issuance of the RFP six months in order to give Microsoft an opportunity to make room for CORBA within its object architecture before finalizing it.

OMG's President Chris Stone said all OMG members, including Microsoft, will be encouraged to submit proposals that specify ways to link applications across a network using CORBA. According to OMG rules, the specification has to be derived from one or more commercially available products. This makes Microsoft's OLE 2.0 a prime candidate since it is one of the few such technologies available today.

However, Microsoft has not decided yet whether to respond to OMG's RFP or how and when it might modify its COM architecture to accommodate CORBA, said Mark Ryland, a senior program manager

But, he said, "If we are going to do something, we should do it in the next three to six months."

Ryland added that Microsoft is already working with a number of other vendors, which he would not name, to provide compatible object systems on non-Microsoft platforms. If these partnerships were well established, Microsoft would be less motivated to modify its architecture to accommodate CORBA.

BLOOD, GUTS AND GATEWAYS

If Microsoft and OMG cannot work together, then the industry will be irrevocably divided into two camps to the detriment of users and vendors. Users will have to take time to evaluate which side offers the best technology. This will retard the growth of the distributed object computing market and cut into all vendors' revenues.

"Both Microsoft and OMG have to compromise here. It's in both of their best interests," Rymer said.

Without a compromise, users will likely resort to using gateways to interconnect incompatible distributed computing environments.

Already, a number of vendors, namely Digital Equipment Corp. and HyperDesk Corp., are prepping gateways between OMG's CORBA and Microsoft's OLE 2.0 (see story, this page).

While these gateways may help users bridge incompatible distributed computing implementations in the short run, they will likely add complexity to users' environments in the long-run because of their proprietary nature. Each gateway is likely to implement a different set of OLE 2.0's more than 400 interfaces.

"Proprietary solutions will only compound the difficulty," Marcus said.

Gateways may be saving grace

One way to integrate the Object Management Group's Common Object Request Broker Architecture (CORBA) with Microsoft Corp.'s Common Object Model is through proprietary gateways, which several vendors are getting ready to ship.

In January, Digital Equipment Corp. will release Version 2.5 of its ObjectBroker, a CORBA-based distributed computing environment that will wrap Microsoft Corp. Object Linking and Embedding (OLE) calls inside CORBA calls and transport them across a net. This will let Windows users create compound documents by invoking OLE-enabled applications residing on other net nodes. It will also allow Windows users to issue OLE calls that invoke CORBA objects running in the ObjectBroker environment.

Officials at HyperDesk Corp. said they will soon announce a gateway, in conjunction with several partners, between OLE nodes running on multivendor, distributed platforms using HyperDesk's CORBA-based Distributed Object Management System.

In addition, the OpenDoc specification from Apple Computer, Inc., Borland International, Inc., IBM, Novell, Inc. and WordPerfect Corp. is expected to provide a gateway between CORBA and OLE 2.0. OpenDoc is being developed as a standard alternative to Microsoft's OLE that will work across multiple platforms instead of just Windows and Windows NT.

BY WAYNE ECKERSON

Texas

Continued from page 1

products. OSI was downgraded to an alternative that is to be used only when justifed on technical and cost grounds. Next week, Texas puts the final nail in the OSI coffin when the interim rule becomes policy.

An early backer of OSI, the state of Texas in 1990 endorsed the Government OSI Profile (GOSIP), the federal OSI procurement mandate set by the National Institute of Standards and Technology. Texas targeted GOSIP as a state policy and directed agencies to buy products conforming to the GOSIP specifications.

"We said GOSIP is necessary to provide intergovernmental unity," said Jerry Johnson, a standards analyst in the Texas department of information resources. "But now we're making a difficult change in our course."

About a year ago, Texas officials began having doubts about OSI products and the way OSI standards are developed (see story, this page). Officials also began viewing TCP/IP, developed under the aegis of the Internet Engineering Task Force, as an alternative for open systems networking.

The straw that broke the camel's back came when Texas officials visited Digital Equipment Corp. and IBM facilities in Dallas, and neither vendor could demonstrate interoperability between their respective File Transfer, Access and Management (FTAM) products, Johnson said.

A review and comparison of OSI and TCP/IP conducted this year by the Texas department of information resources concluded that products conforming to GOSIP requirements — including the third version of GOSIP now in limbo due to the federal policy review — will not be available until 1995 at the earliest.

"It is likely to be 1997 before we see significantly lower costs for OSI-conformant products," the Texas report stated.

In contrast, products based on TCP/IP protocols are considered widely available and cheaper. Although TCP/IP applications are not seen as feature-rich as OSI, there appear to be more technical personnel knowledgeable to support TCP than OSI, Johnson said.

But TCP/IP also has problems, such as its address limitations. But like many in the federal government, Texas policymakers hope to ultimately see a convergence of the two protocol suites.

While Texas is trying to make a clear fit between policy and procurement, other state and federal agencies seem to be more casual about practicing what they preach. Federal agencies have been known to award contracts for indefinite quantities of both OSI and TCP/IP products, and then only purchase and install those based on TCP/IP. Some agencies, such as the Department of Veteran's Affairs, have simply ignored the GOSIP mandate.

This has not made life easy for vendors investing in OSI, Johnson noted. He added that the Social Security Administration (SSA) wanted his division to build a client/server-based prototype of a system for benefits eligibility, but SSA officials insisted that it had to be built using IBM's Systems Network Architecture.

The District of Columbia has a GOSIP policy that states, "The district government is committed to the GOSIP OSI standards [and] each district agency should develop a program to adopt the GOSIP OSI concept in its information systems plan."

This week, the district government here will take bids on its citywide telecommunications system request for proposal, which calls for installation of thousands of personal computers and terminals on 80 local-area networks in 400 buildings to connect transport services that may include frame relay, X.25 or Switched Multimegabit Data Service.

The district's GOSIP policy supports X.400 for electronic mail for PC LANs, but the RFP now out for bid designates Lotus Development Corp.'s cc:Mail as the "the district's standard E-mail package" for LANs. The OSI standard X.400 will only be used as a gateway to link different E-mail system when needed.

"There is not a large number of native X.400 E-mail packages for PCs and LANs out there," said Gary Rowe, a principal with Rapport Communication, a consultancy in Cincinnati.

But Rowe emphasized that vendors such as Microsoft Corp. have pledged to deliver X.400 server capability in the future, and large Fortune 500 companies, such as Wal-Mart Stores, Inc., are now increasingly deploying both native and gateway X.400 E-mail as their messaging information infrastructure.

Reinventing OSI

U.S. users and vendors participating in the international Open Systems Interconnection standards effort are pressing for reforms in the way OSI standards are drafted.

Members of the OSI Implementors Workshop (OIW), the North American group that picks apart often-complex OSI protocols to create working implementation specifications, are demanding a more real-world approach to standards making that will bring interoperable OSI products to market more quickly.

One OIW working group, the Open Systems Environment Technical Committee, proposed in March that the OIW adopt a policy favored by the Internet Engineering Task Force (IETF). The IETF will not approve a new Transmission Control Protocol/Internet Protocol standard until working implementations are up, running and interoperable.

"Our objective is to have at least two interoperable implementations available, with at least one implementation in the public domain," the OIW technical committee suggested.

The OIW committee also wants to put all OIW standards documents in electronic form for dial-up access at the National Institute of Standards and Technology, which is the OIW secretariat.

The proposal, which was distributed to the other regional standards bodies throughout the world, is expected to be formally codified into the OIW Procedures manual at the next meeting in December.

"The process itself was broken, and the concept that we introduced in March said, let's take the Internet model further," said Jerry Johnson, the state of Texas' policy analyst and an active participant in the OIW.

Vendors, too, are rethinking OSI, which to date has been developed on the premise that the more that could be packed into a standard, the better.

The complexity of OSI standards has required that they be narrowed into a subset, called a profile, to be working products. This has made interoperability a concern.

In an about-face, vendors in the OIW are now putting the final touches on Minimal OSI (Mosi), the upper layer stack supporting a minimum set of applications services, such as connect/disconnect and send/receive.

Vendors believe Mosi will satisfy at least 80% of all user application requirements.

Henry Lowe, technical consultant at Open Software Foundation, Inc., said Mosi will be used in the Distributed Computing Environment (DCE) when it is implemented for OSI.

"Vendors are free to map DCE onto whatever they want," Lowe said. "But for interoperability, you can map DCE onto OSI, and all vendors should do it the same way."

BY ELLEN MESSMER

New to DEC's client/server arsenal

■ **Polycenter Advanced File System** — Ensures availability of OSF/1 files by providing access during system maintenance, security against deletion and fast system reboot; better file system management performance; included with DEC OSF/1 2.0 license; available Jan. 94.

■ **DECsafe Available Server** — Provides automatic switch to backup OSF/1 server in case of primary server outage; available first-quarter 1994; pricing not determined yet.

■ **Load-Sharing Facility Cluster Compute Share Software** — Provides load balancing and batch services for clusters of DEC OSF/1 and other Unix systems; costs $995; available now.

■ **DEC SNA Peer Service for DEC OSF/1 AXP systems** — PU 2.1 gateway for access to IBM hosts from DECnet and TCP/IP nodes; costs $3,995 to $32,000; available in December.

■ **Polycenter Networker Save and Restore** — Provides on-line, unattended backup of Unix and MS-DOS files; costs $75 to $250; available in December.

■ **COHESIONworX** — A computer-aided software engineering development environment for distributed Unix applications; costs $2,300; available now.

■ **ObjectBroker** — Integrates new and existing applications via object-oriented programming; fosters communications between Unix and PC applications via Common Object Request Broker Architecture standard; costs $300-$5,000; available now.

■ **eXcursion** — Turns Windows or Windows NT PC into an X terminal for access to applications on Unix servers; costs $295 through March 1, 1994 for Windows NT and $395 for Windows; available now.

■ **MailBus 400 for DEC OSF/1 1.0** — Links Alpha systems running OSF/1 to DEC X.400 mail backbones; supports TCP/IP transports via RFC 1006; costs $5,000-$10,000; available Jan. 94.

■ **MailBus 400 for OpenVMS 1.1** — X.400 messaging backbone with integrated X.500 directory service; costs $5,000-$20,000; available in November.

■ **DEC Mailworks for DEC OSF/1 1.0** — Messaging server to MailBus 400 backbones; supports X.500 directory lookup and TCP/IP transports; costs $140-$1,500; available Feb. 94.

■ **Microsoft Mail Driver for DEC Mailworks** — Enables Mailworks server to attach Microsoft Mail clients to MailBus 400 backbone; pricing and availability undetermined.

SOURCE: DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

DEC

Continued from page 1

A big part of what it takes, DEC believes, is LinkWorks. LinkWorks is an object-oriented development environment for turning personal applications into groupware applications so users can work on them collaboratively, said Audrey James Augun, DEC's marketing manager for Electronic Messaging and EDI.

LinkWorks allows users to group applications — such as a spreadsheet, database or electronic document — as an object and display that object as an icon on a graphical user interface. It also allows users to add file and document routing capabilities to these objects so they can be shared by a work group.

For example, a sales department writing a proposal may want to group an electronic document with a database and spreadsheet so sales history and forecasting information can be added to the document as the proposal is written. All components remain grouped as one while the proposal is passed along and updated.

LinkWorks runs on Windows, Apple Computer, Inc.'s Macintosh and Unix clients, and The Santa Cruz Operation, Inc.'s SCO Unix, OSF/1 and DEC Ultrix servers. It works with DEC Pathworks LANs and X.400 messaging backbones.

Versions for Windows NT clients and servers, OS/2 clients and OpenVMS servers are also in the works.

Prices for LinkWorks start at $299 per user. The product will ship in December.

SERVER CITY

Other key components of DEC's client/server crusade, meanwhile, include six new VAX servers.

The servers include a variety of enhancements to previous offerings, including twice the number of Small Computer System Interface ports, a 50% boost in transaction performance and new fault-tolerant machines.

The servers range in price from $19,530 for a MicroVAX 3100 Model 90 to $175,000 for the fault-tolerant VAXft 810. All are available now.

DEC also unleashed several new Alpha-based servers, highlighted by the DEC 2000 Model 300 AXP.

This unit features a six-slot Extended Industry Standard Architecture bus and can run the OpenVMS, DEC OSF/1 or Windows NT operating systems. It costs $9,695 and is available now.

An OpenVMS version of the DEC 2000 Model 300 AXP can come preconfigured with DEC's Pathworks LAN operating system as the Alpha AXP PCLAN Server. Prices for this unit start at $6,995, and it is available now.

The rest of the Alpha servers feature a performance boost from 30% to 50% over previous models. They are priced from $21,190 for the DEC 3000 Model 600S AXP to $66,372 for the DEC 4000 Model 710 AXP. All are available now.

All of these new servers will be able to run Pathworks 5.0, a new release of DEC's LAN operating system. Pathworks 5.0, which was expected (*NW*, Jan. 4, page 1), also supports DOS and Windows clients.

Pathworks 5.0 includes an application called Manageworks that allows net administrators to handle Microsoft's LAN Manager, Novell, Inc.'s NetWare and Pathworks servers from a single Windows client.

Pathworks 5.0 is also now available on a concurrent use license in addition to the usual per-client license arrangement.

Pathworks 5.0 is available in January and is priced at $205 per client, or $3,000 for a concurrent use license of 100 users to $18,750 for 250 users.

SERVICE OFFERINGS

Lastly, DEC announced 10 new service offerings to help users plan, design, implement and manage client/server environments.

With these new services, DEC will assess a customer's operations and pinpoint areas for improvement; provide on- and off-site system management and security assistance; and help users implement middleware and groupware and work flow applications.

All of the services are available now. They are priced on a per-contract basis.

✆DEC: (800) 344-4825.

Face-off

Continued from page 1

to ensure SNA's role in future networks.

"This is a highly religious subject inside IBM, because they are heavily invested in TCP/IP and APPN technology, and the user community, where long-range networking decisions are being made," said Thomas Routt, president of Vedacom, which specializes in net architectures and design.

Routt coauthored the study with John Pickens, a consultant with the Mayfield Fund venture capital firm in Milpitas, Calif., and Louise Herndon Wells, director of SNA internetworking at the Internet Technical Institute, an internetworking consultancy also in Milpitas.

"We weren't looking to trash TCP/IP or APPN, but rather point out the differences between the two so users could make informed decisions," Routt said.

HOW IT'S DONE

Vedacom enlisted InterLAB in Sea Girt, N.J., to conduct the performance tests. The tests measured APPN's and TCP/IP's ability to handle 100K-byte file transfers and inquiry-response transactions using a 1K-byte file across five different net configurations. The file transfers and transactions were conducted between 80486 Personal System/2s running OS/2 Version 2 — which supports APPN — and FTP Software, Inc. TCP/IP software. The tests were conducted at 50% and 90% net congestion levels.

The test configurations included one 16M bit/sec Token Ring, two 16M bit/sec Token Rings connected by a local bridge, two 16M bit/sec Token Rings connected by Novell, Inc.'s Multiprotocol Router (MPR) and two 16M bit/sec Token Rings connected via a simulated T-1 link supporting remote local-area net bridging and MPR routing.

The most startling results were recorded during the file transfer test conducted on a single ring. Using APPN, the test team achieved throughput of almost 15M bit/sec on the 16M bit/sec LAN, compared to only about 4M bit/sec using TCP/IP. In the test where data was routed over a T-1 link between Token Rings, throughput was about 3M bit/sec using APPN and 1.5M bit/sec with TCP/IP. In the inquiry-transaction test, the APPN application achieved about 180 transactions per second and the TCP/IP application about 90 transactions per second across the single Token-Ring LAN.

"The tests show APPN to be a better performer in most configurations," Pickens said. "But I'd like to see many more tests before I made any firm conclusions."

Routt said there are many reasons why APPN would be a better performer than TCP/IP. For one, data flow control within the APPN architecture is more efficient and dynamic than in TCP/IP. The OS/2 APPN stack may also be better designed than the FTP Software TCP/IP OS/2 stack. FTP Software did not return calls for comment.

"We think the study shows some exciting results because, until now, APPN performance has gotten a bad shake," said Marsha Peters, lead APPN architect for IBM. "APPN is a real screamer."

Well, not exactly a screamer, said Anura Guruge, an independent analyst based in New Ipswich, N.H. "[InterLAB] didn't do much testing with Intermediate Session Routing between APPN nodes, which would have slowed performance."

ISR requires data traversing an APPN net to be processed at each Network Node along the way to its destination. It will be eliminated with IBM's High Performance Routing, which promises to improve APPN network performance by as much as 10-fold.

Gerry Williamson, senior systems programmer for communications at the Provident Life and Accident Insurance Co. in Chattanooga, Tenn., said the InterLAB tests reflect his firm's experiences with APPN. "We have the mainframe as our central Network Node with everything else as an End Node," he said. "We don't worry about how many [ISR] hops are in our net."

Provident has a full-blown APPN net and was a beta site for IBM's VTAM 4.1, which supports APPN. "We tested a TCP/IP application between one of our Token Rings and the mainframe and got a 200K to 800K bit/sec throughput," Williamson said. "With a similar application running APPN, we got 10M to 12M bit/sec throughput. We stuck with APPN because we wanted to move large amounts of data between our mainframe and LANs. TCP/IP didn't seem to offer us that [option]."

✆Vedacom: (206) 527-3434; InterLAB (908)528-3300.

NETWORK WORLD

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